DECEMBER 27, 1954

made in
ITALY

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

made in
GERMANY

made in
SWEDEN

made in
ENGLAND

MADE IN
JAPAN

Competition?

page 38

made in
BELGIUM

made in
France

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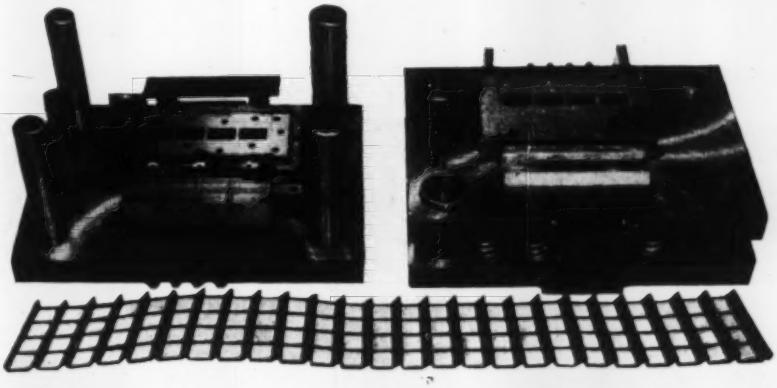
Like An Organ Player, The Operator Rolls Steel from button-panel using schedule No. 1 while an assistant prepares schedule No. 2 for a change in rolling requirements.

Also In This Same Plant Is The World's Largest Plate Mill (shown above). It too has been ECAM controlled for many years.

Tool Steel Topics

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation



Maker of Agricultural Machinery Gets Good Results With Lehigh H

The Gleaner Harvester Corp., Independence, Mo., has every reason to be proud of its revolutionary, self-propelled combine. For this mechanical marvel, with its centerline design, is a joy to behold as it takes large, continuous bites into blowing fields of grain.

Making parts for this practically human thresher and separator calls for some highly specialized dies made from outstanding tool steels. For example, the progressive die shown here, made of Bethlehem Lehigh H tool steel, produces the combine's straw rack (foreground). Operating in a 150-ton press, the die blanks and forms 22-gage galvanized sheet steel, about 50 strokes of the press being required to make each rack. The die is subjected to more than 20,000 strokes before inspection is required — ample proof of its durability.

Lehigh H is our high-carbon, high-chromium air-hardening tool-and-die steel. It's outstanding for long production runs because of its wear-resistance and toughness. Moreover, it offers minimum distortion during heat-treatment, plus the ability to harden deeply.

Lehigh H is safe-hardening. It is cooled in still air from a hardening temperature of 1850 F, and minimizes the cracking hazards of intricate dies, thin sections, and insufficient radii.

Your tool-steel distributor will be pleased to answer your questions about Lehigh H. He's always at your service.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

Carburization of Tools Can Be Detrimental

Widely known are the beneficial effects obtained by intentionally carburizing some tools during heat-treatment. In general, wear-resistance of the surface is increased, while at the same time the shock-resistance of the core is maintained. But what is frequently overlooked is that carburized cases added unintentionally can be detrimental to service life.

Laboratory study of failed tools has shown this type of trouble often happens. For example: Rivet sets, failing from brittleness after short service, were found to have a carburized case; coining dies failed by splitting, due to a deep carburized case (0.030 in.); an extrusion punch shattered, due to an excessive carburized case (0.040 in.), containing 3.34 pct carbon.

Unintentional carburized cases commonly result from heat-treatment operations where there is improper control of atmosphere, such as "inert" packing material, "neutral" atmosphere in furnace, and "neutral" salt bath. All of these, of course, are actually carburizing.

The cure for this type of trouble is simple — don't put on a carburized case. Or if you do, be sure to grind it off later. On most tools the required dimensions will not permit grinding off an excessive case. So the practical solution is proper control of the heat-treatment.

High-Speed Tool Steel Cuts 35 Teeth in Bronze Worm Gear

This tangential cutter, fitted with an insert of Bethlehem 66 High-Speed Tool Steel, is shown cutting a tooth on a bronze worm gear. The gear is 74 in. in diameter and is 3-1/16 in. deep. It has 35 teeth, having a circular pitch of 6.25 in. With its excellent red-hardness, balanced abrasion and shock-resistance, Bethlehem 66 High-Speed is an ideal steel for difficult cutting jobs.

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BEARINGS

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buy from the manufacturer who has a **Complete Line**

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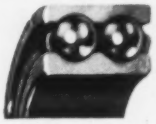

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Spherical Roller Thrust

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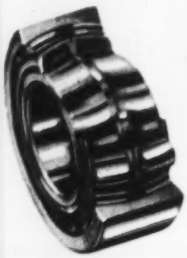
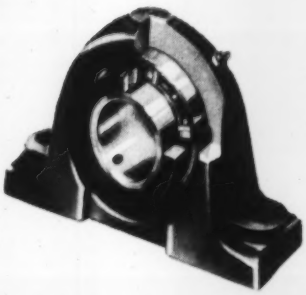


FIRST with the improved (Type "C") Spherical Roller Bearing, which provides more capacity and longer life than any spherical design available



FIRST with the "SY" Pillow Block, with the most effective seal ever developed for keeping lubricant *in*, dirt *out*.

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7569

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BEARINGS AND PILLOW BLOCKS

From the men who design... to the men who use...

The handling ease of an ATLAS Sling means safe, fast, LOW-COST HANDLING

30,000-lb. propeller being handled with one 8-part ATLAS Braided Sling in figure 8 Choker-Hitch. Notice how the braided body hugs the contour of the load.

A sling designed to handle easily will handle loads faster. That's the reason why flexibility, lightness, and handling ease are part of the basic design of Macwhyte ATLAS Round-Braided Slings.

Here's how handling ease is built into the finished ATLAS Sling: all ropes in ATLAS Slings are braided in a continuous, spiral path. Ropes are endless—all ropes in the body are the same length and carry an equal share of the load. There are two pairs of Left Lay, and two pairs of Right Lay ropes—making a total of eight ropes in the equally balanced-braided body of the Sling.

Users can attach ATLAS Slings faster because of their "built-in" handling ease. And these Slings last longer because they do not snarl, kink, or curl up as easily as ordinary slings.

Many Macwhyte Slings of standard design in Round-Braided, Flat-Braided, Single-Part, and Grommet Slings are illustrated in the Macwhyte Sling Catalog. Special slings can be designed to meet individual requirements.

Macwhyte engineers will gladly recommend the proper sling for your material handling needs. Their recommendations can save you time, money, and labor.

Ask any Macwhyte distributor, or write direct to:

MACWHYTE COMPANY
2912 Fourteenth Ave., Kenosha, Wis.

Send for Bulletin 5308 containing load rating tables, illustrations, and general information on slings.

MACWHYTE

Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope, and Wire Rope Assemblies. Catalogs available on request.

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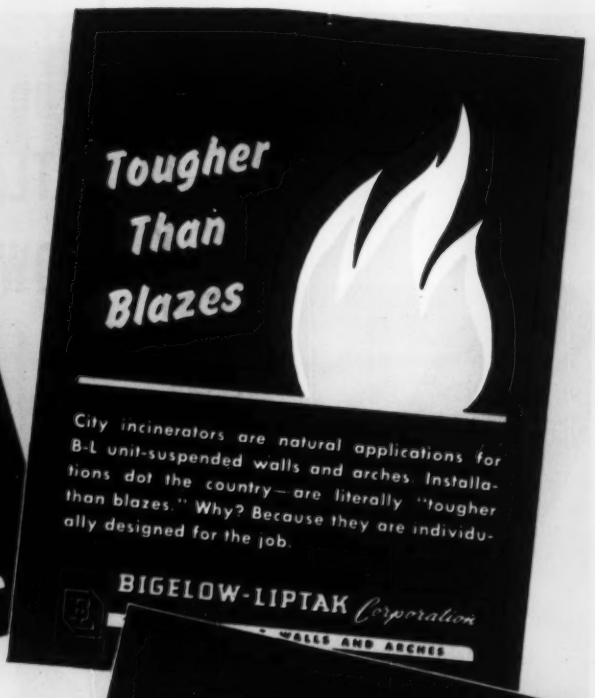
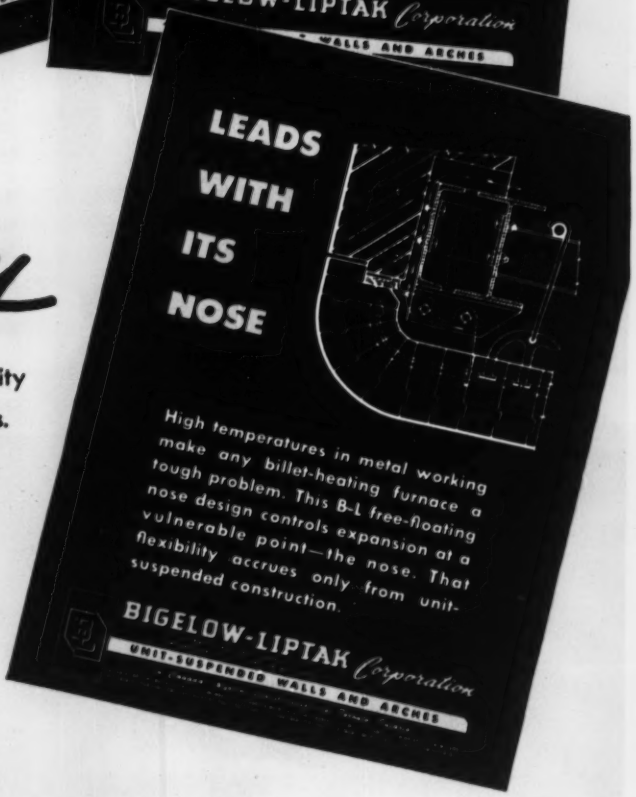
Big boilers for utilities and general manufacturing? B-L's tube supported wall design and Texad* finishes eliminate enclosure structural steel and steel plate casings. That saves plenty on the original cost! Performance? Better than ever!
BIGELOW-LIPTAK Corporation
UNIT-SUSPENDED WALLS AND ARCHES


Tougher Than Blazes
City incinerators are natural applications for B-L unit-suspended walls and arches. Installations dot the country—are literally "tougher than blazes." Why? Because they are individually designed for the job.
BIGELOW-LIPTAK Corporation


LEADS WITH ITS NOSE
High temperatures in metal working make any billet-heating furnace a tough problem. This B-L free-floating nose design controls expansion at a vulnerable point—the nose. That flexibility accrues only from unit-suspended construction.
BIGELOW-LIPTAK Corporation
UNIT-SUSPENDED WALLS AND ARCHES

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You'll find that versatility is an inherent quality in B-L's design for furnace walls and arches. Thermal problems—erosion hazards—desired end results—are factors that govern the final design. That's why you see so many B-L installations through industry. After all, they provide long, dependable service at a low, low cost. More information? Write today.

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This Week in Metalworking

STEEL

Vol. 135 No. 26 December 27, 1954

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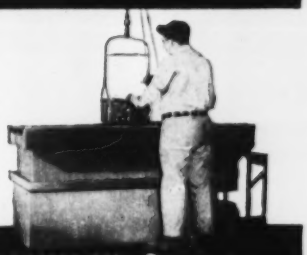
cut cleaning costs RIGHT DOWN THE LINE!



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lower cost
EYE BOLTS
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Among Pawtucket's many specialty products are these lower-cost eye bolts or "swing" bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.

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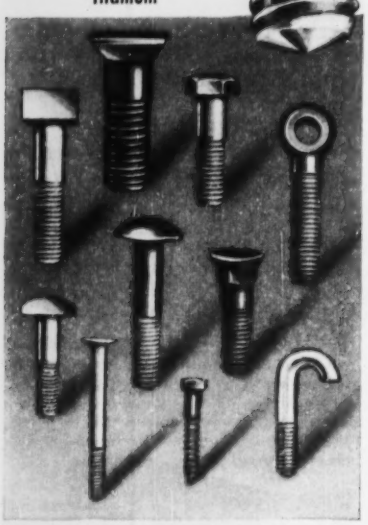

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THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.
"The Bolt Man"

behind the scenes

Mexican Titanium

At this writing Irwin Such, Editor of STEEL, is somewhere south of the border rustling up a lot of first hand information on titanium. As you know, titanium is the current darling of engineers who are faced with the problem of constructing aircraft that will hold together at supersonic speeds. More particularly the problem is to assemble a craft that will pass through the thermal barrier without melting, and incidentally cremating highly trained and expensive Air Force personnel.

Republic Steel, which is developing vast Mexican deposits of rutile, the ore from which titanium is refined, invited a crew of distinguished business journalists to inspect the diggings, and Irwin went along to represent STEEL. Brief post card messages that fluttered back here through the snow flakes suggested that Irwin had gathered enough notes to fill a book, some of which appear in the story on page 30. We wrote to a close bandit friend in Guadalajara, Jumping Jose, who, for business reasons, keeps a sharp watch on tourists. He reported as follows:

Oh, Senor Such
He say he weel
Feex op a spread
For nex' week STEEL.
An' when you read
What Irween say,
Amigos, you
Weel shout "Ole!"

Monumental Yearbook

About a month ago the staff assembled to consider the cover design for STEEL's 1955 Metalworking Yearbook. One doesn't lightly compile three lbs. of magazine and then wrap it in any old design. Perish forbid! It was agreed to let Managing Editor Walt Campbell's lead-off article, "Strengthen Your Management Team for the Competitive Years Ahead" establish the theme, and at that point Art Director Bill Kellogg and his assistants took it away. The cover kicked back and forth between the Art Department and Editorial Conference Rooms for about three weeks before Art Bouhall was allowed to finish it, but then he was and he did, and we think you'll like it.

Schoolboy Baffles J.&L.

Johnny Levine, who holds down a grammar school seat in South Norwalk, Conn., recently placed an order for steel with the Jones & Laughlin Steel Corp., Pittsburgh, Pa. "Dear Sirs," scribbled Johnny, "My teacher assigned me to get ore sample. Please send me one teaspoonful of steel as it is found in the ground."

Chagrined executives of the great steel corporation hung their heads; nobody could be found who was willing to hold a teaspoon under a ladle of molten steel. They sent their regrets to Johnny, informed him that finding steel in the ground was a trick more difficult than he imagined, and settled by sending him a sample of iron ore together with some special easy-to-read literature on steelmaking.

Pop Eyed Dept.

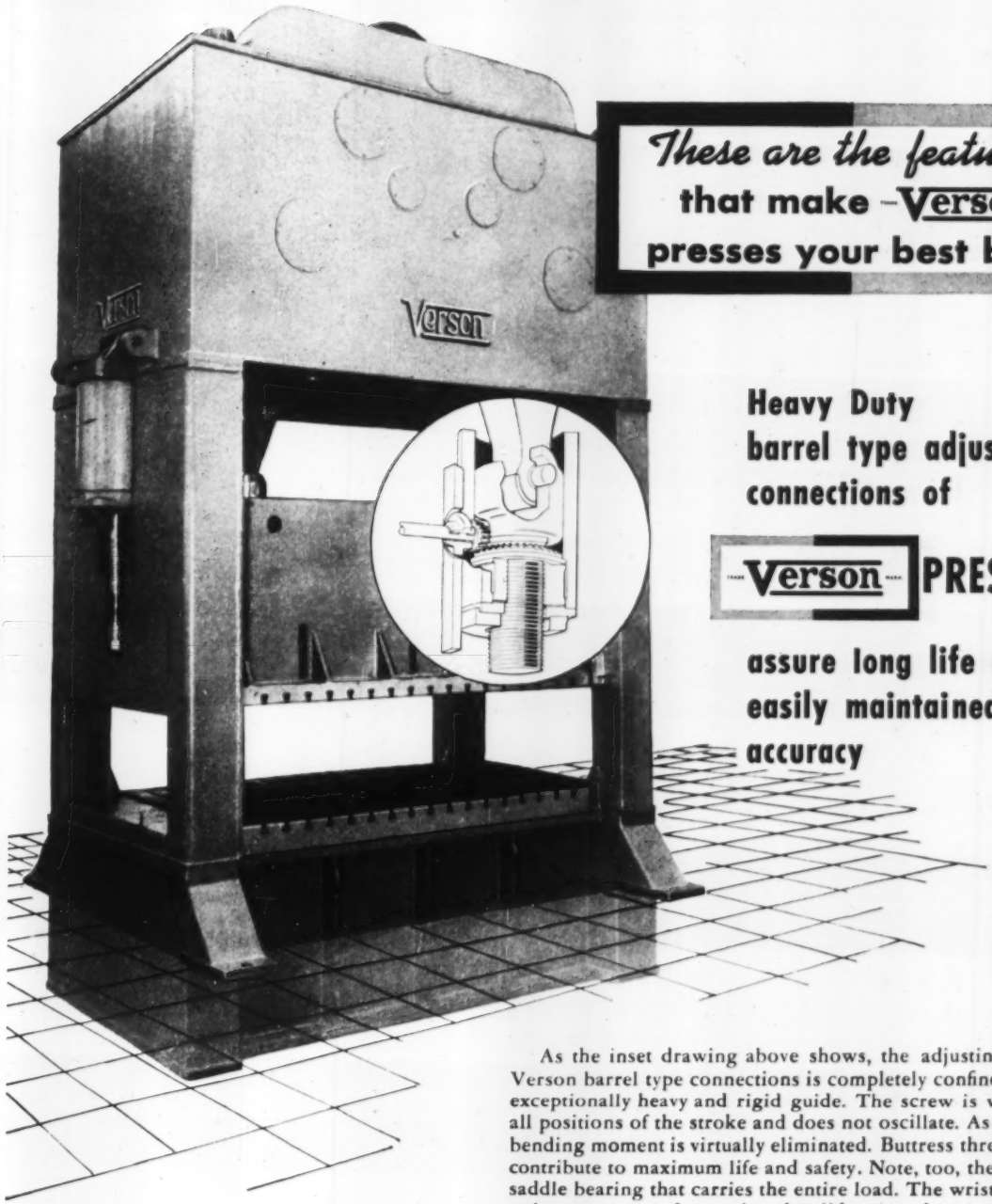
Assistant Editor Mike Webster, who came to STEEL by way of Oxford, sometimes has trouble with his amanuensis. Listening to one of his dictaphone letters, wherein he alluded to Xmas parties and "fanny-patting in the corners," she translated it as "penny setting", because she couldn't believe that nice young Mr. Webster said what she *thought* he said.

For Auld Lang Syne

In pleasant observance of this, the Holiday Season, we join the entire staff of STEEL in extending to you our best wishes for Happy Holidays and a Glad New Year.

Shrdlu

Metalworking Outlook—page 19



These are the features
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Heavy Duty barrel type adjustable connections of

Verson PRESSES

assure long life and easily maintained accuracy

As the inset drawing above shows, the adjusting screw of Verson barrel type connections is completely confined by an exceptionally heavy and rigid guide. The screw is vertical at all positions of the stroke and does not oscillate. As a result, bending moment is virtually eliminated. Buttress threads further contribute to maximum life and safety. Note, too, the heavy saddle bearing that carries the entire load. The wrist pin serves only as a means of returning the slide to stroke up position.

Adjustment can be manual or motorized. In either event, the extra long adjusting screw provides exceptionally liberal adjustment.

This is another example of the kind of engineering that has won for Verson presses their reputation for quality. For you, it all adds up to better stampings at lower cost. Whether you require a single press or an entire stamping plant complete with tooling, we'll be pleased to make recommendations.

Catalog G-53 presents basic data on the entire Verson line. Write for your copy, today. It may be the first step towards the more efficient production of stampings.

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ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

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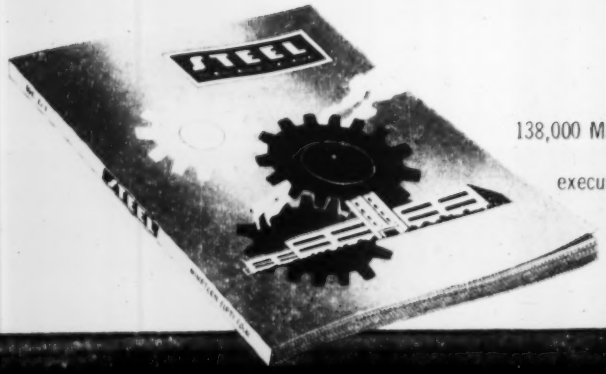
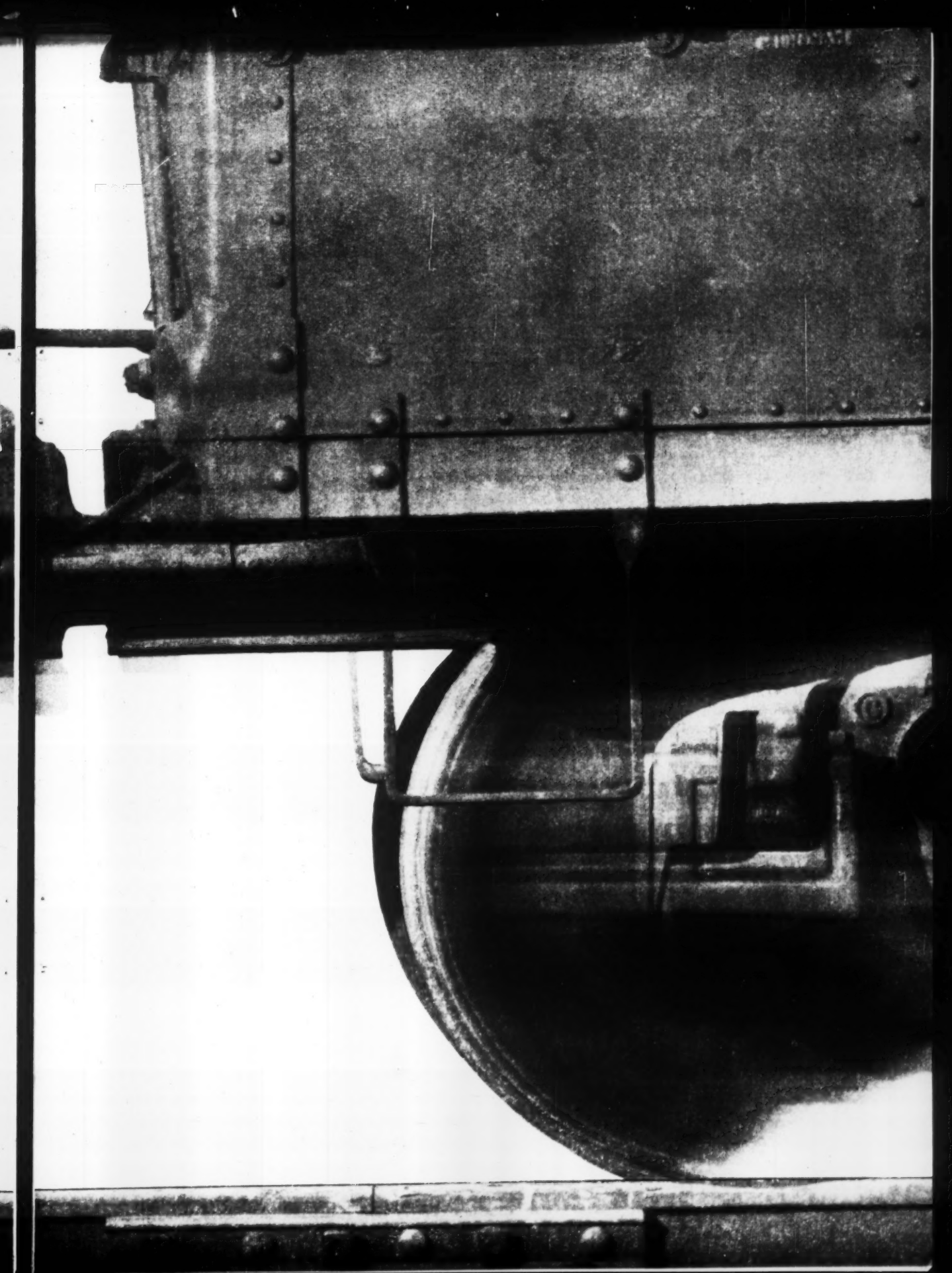


138,000 Management, Production, Engineering and Purchasing executives in metalworking read it . . . use it . . . depend upon it!



FIRE!

PUT IT OUT IN SECONDS
with a Kidde Portable extinguisher

Unless you get the jump on fire the minute it starts, you stand a good chance of kissing your business good-bye.

That's why it's so important to have a Kidde portable extinguisher near *every* fire hazard in your plant.

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LETTERS
TO THE EDITORS

Surprised by Nylon Use

In the "Technical Outlook" for Nov. 29, p. 67, reference is made to a Naval Research Laboratory statement regarding dry nylon and its high friction coefficient.

Can you furnish us with the source of this information? We are somewhat surprised that dry nylon is an excellent bearing material.

Burton S. Garrell
Burroughs Corp.
Detroit

• *That "Technical Outlook" item was based on information in "Navy Technical News" released by Office of Information, Navy department, Washington. Telephone is LIberty 5-6700, ext. 78076 or 76944.—ED.*

Climbing Sales Forecasted

Two or three months ago you had an article commenting on the anticipated market for steel scaffolding for the year 1954-1955 ("Scaffolding Hits New Heights on Crest of Construction Wave," Oct. 11, p. 69). Our copy of this magazine has been mislaid, and we would like to get another.

W. H. Atkinson
sales manager
scaffold sales
Brainard Steel Division
Sharon Steel Corp.
Warren, O.

• *Sent.—ED.*

Winning Combination

As producers of Sullvyne-Clad, you may be sure O'Sullivan Rubber Corp. is gratified that STEEL considered development of a commercially sound vinyl-metal laminated sheet a subject important enough to be featured in your Dec. 6 issue on p. 116, "When Metal Weds Plastic . . . A New Material Is Born." However, we believe you will want to correct an unfortunate error in your otherwise splendid story.

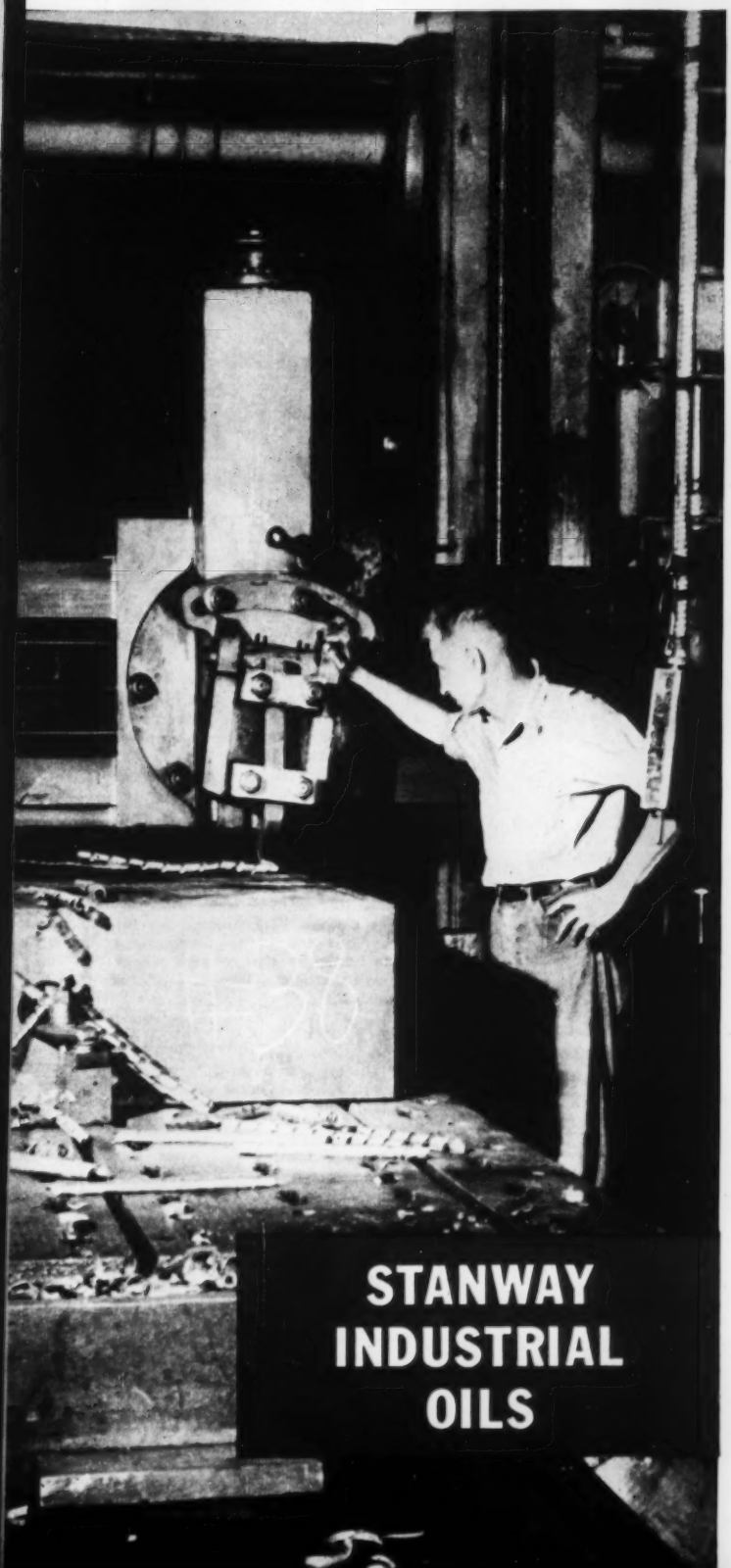
O'Sullivan is not licensed under any process claimed by Naugatuck Chemical Division, U. S. Rubber Co., as stated in your article or by any other company. Sullvyne-Clad is 100 per cent an O'Sullivan development, process and product, the result of two years work by our technical staff at a cost to date of more than $250,000.

To let stand uncorrected any impres-

(Please turn to page 12)

How a little talk
(with the right person)

The "right person" was E. F. Aschemeyer, at left, Standard Oil lubrication specialist. His practical experience and training helped Elkin solve *their* problem.



stopped a lot of chattering

Chattering and scoring of ways was causing trouble for the Elkin Tool and Manufacturing Company of Detroit. The trouble was noted on a big planer operating under extremely heavy loads. A Standard Oil lubrication specialist recommended the use of STANWAY #95, a very stable oil having extreme oiliness and containing a tackiness agent. Result: smooth operation, complete elimination of chattering and scoring.

STANWAY Industrial Oils were developed to meet the extreme oiliness requirements of certain machine tools which customarily operate under very heavy loads. STANWAY Oils are part of a complete line of industrial oils, cutting oils and coolants that serve all industry.

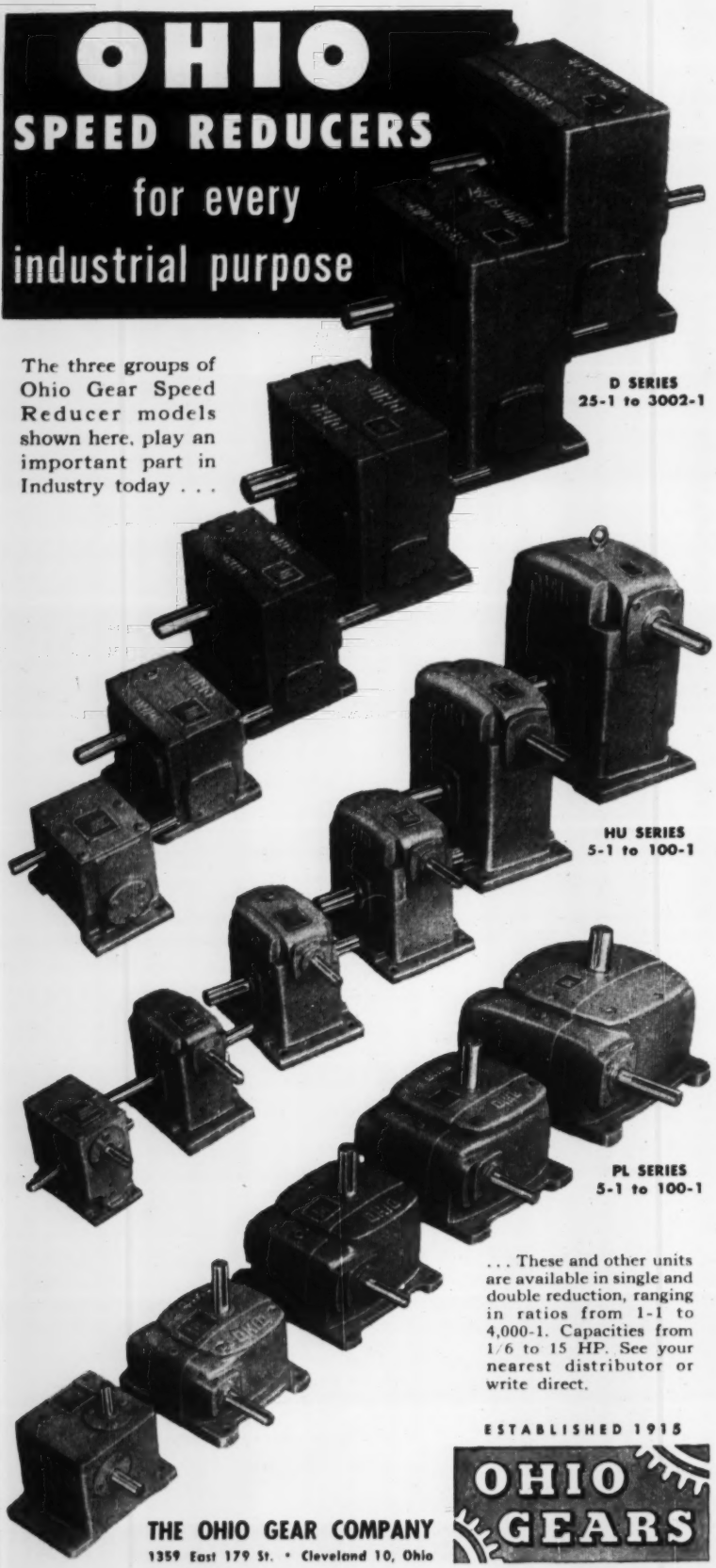
No matter how "special" your problem may be, there's a Standard Oil product to solve it. There's also a near-at-hand Standard Oil lubrication specialist to help you select and apply the right one. To obtain his services call the Standard Oil office nearest you, or write Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

STANDARD

STANDARD OIL COMPANY
(Indiana)

OHIO
SPEED REDUCERS
for every
industrial purpose

The three groups of Ohio Gear Speed Reducer models shown here, play an important part in Industry today . . .



. . . These and other units are available in single and double reduction, ranging in ratios from 1-1 to 4,000-1. Capacities from 1/6 to 15 HP. See your nearest distributor or write direct.

ESTABLISHED 1915

OHIO GEARS

THE OHIO GEAR COMPANY
1359 East 179 St. • Cleveland 10, Ohio

LETTERS

(Concluded from page 10)

sion that our process came from some other company would be a grave injustice to the O'Sullivan employees who developed the vinyl formulations, designed and largely built the production equipment, achieved the bonding techniques and created the metal treating processes.

In fact, their pioneering efforts enabled O'Sullivan to be the first commercial maker of a vinyl-metal laminate by continuous production methods. Some of our techniques have been judged to be new inventions and patents have been applied for.

Vincent A. Catozella
president
O'Sullivan Rubber Corp
Winchester, Va

• *Thank you for this correction.—ED*

Big Blow for Industry

I enjoyed reading your article, "Compressed Air for Expanded Use," on p 100 of the Dec. 13 issue. (Tighter oversize air distribution systems are smart insurance for future growth . . . .)

Will you please send me the address of the Compressed Air & Gas Institute?

Stan B. Hansen
secretary-treasurer
Hanson Scale Co
Northbrook, Ill

We would like to have more information on the article, "Compressed Air for Expanded Use" . . . the Compressed Air & Gas Institute is listed as a source of such information. Please send us their address.

R. L. Poteat
J. D. Wilkins Co
Greensboro, N. C

• *It's 122 E. 42nd St., New York. Frank P. Anderson is secretary.—ED.*

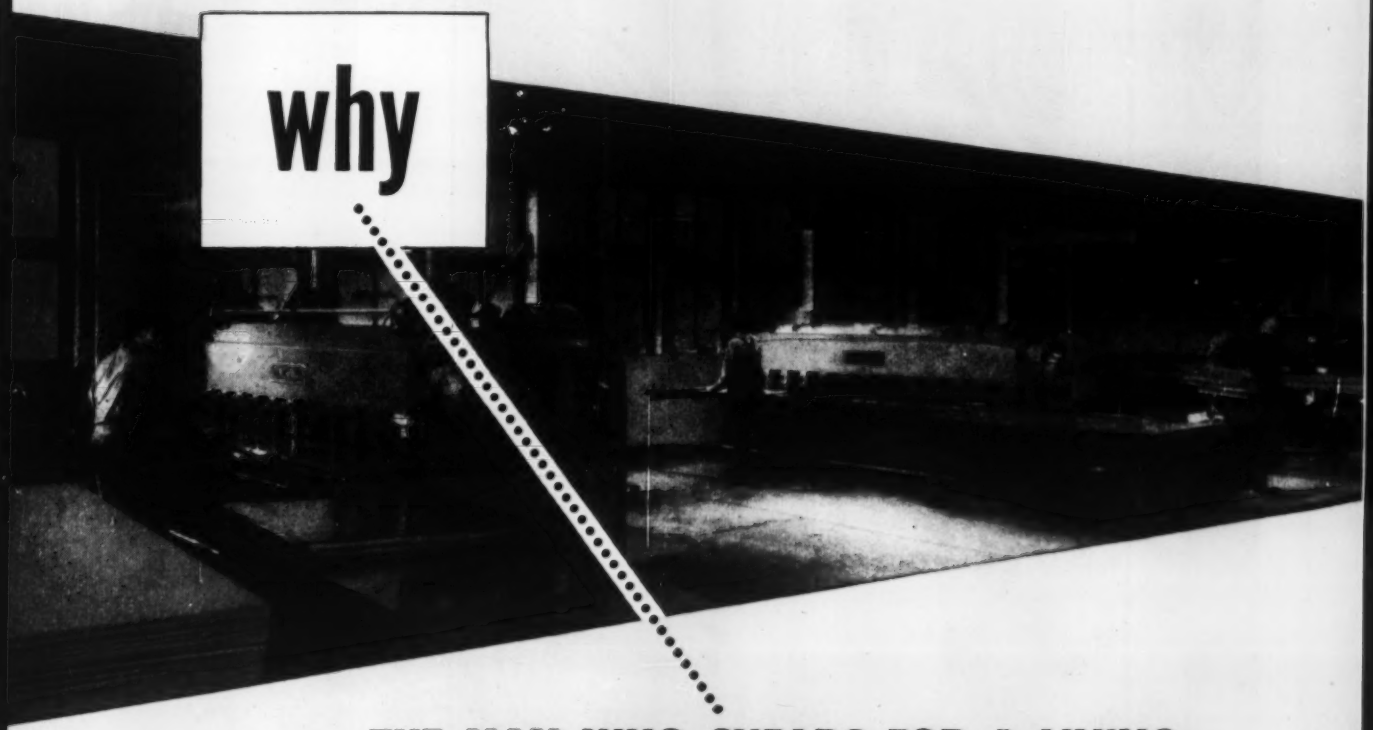
One in a Series

Would you be kind enough to send us about 25 tear sheets of the article, "Profit Is the Real Yardstick of Design," No. 10 in STEEL's 1954 Program for Management, Nov. 22, p. 81? It is a fine thesis and one in which many of our men would be interested.

Congratulations on this good program and on your excellent continuation of traditionally fine STEEL editorials.

Nevin J. Rodes
Jeffrey Mfg. Co
Columbus, O

• *They're sent.—ED.*



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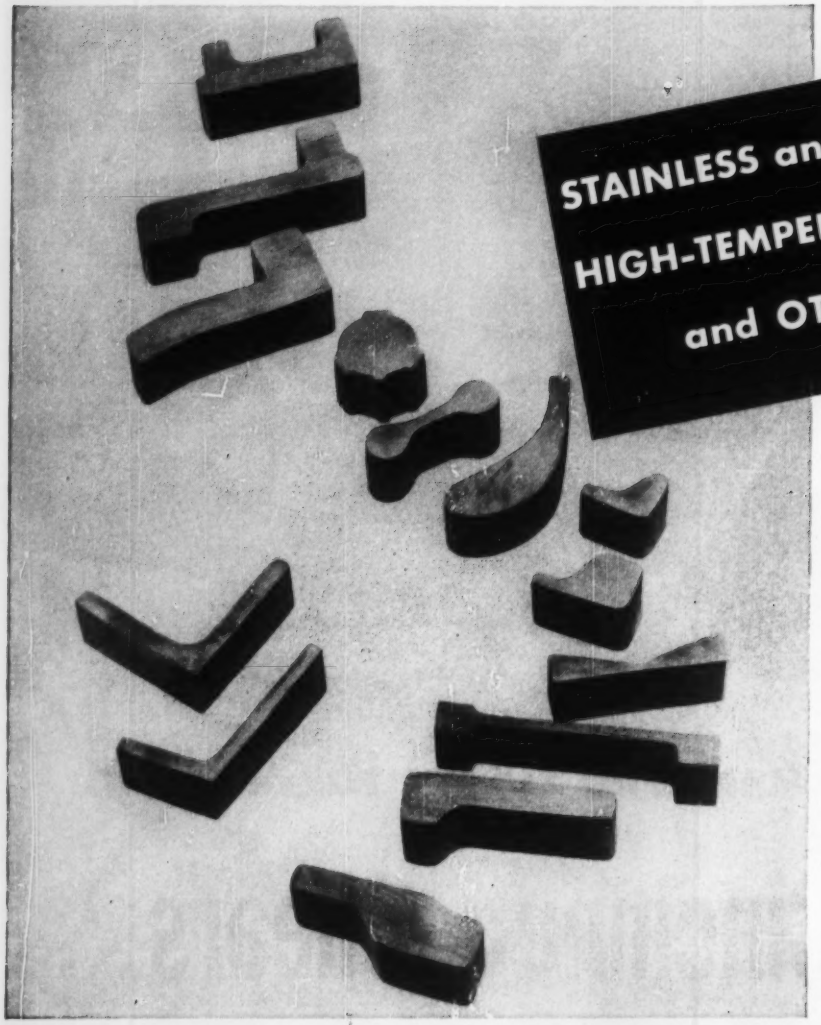

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FLOOR TO FLOOR

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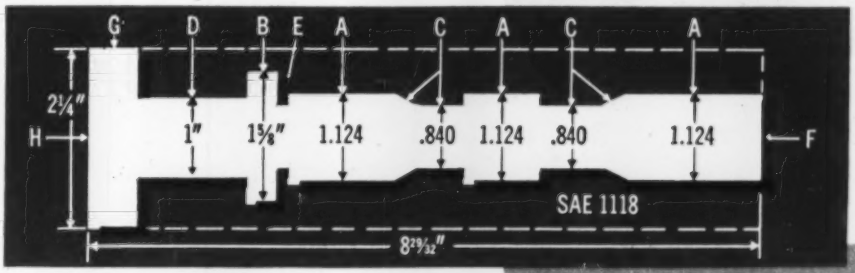
B. Turn — 489 RPM — .015" Feed
C. } Form — 119 RPM — .0025" Feed
D. }
E. Face, shoulder, neck, undercut, HSS
F. Face 243 RPM — .0035" Feed
G. Knurl
H. Cut off — 243 RPM — .0035" Feed



IN 1954 this same job takes...

5.00 min.

FLOOR TO FLOOR

A. Turn — 1000 RPM — .022" Feed
B. Turn — 1000 RPM — .022" Feed
C. } Form — 340 RPM — .0035" Feed
D. }
E. Face, shoulder, neck, undercut
F. Face 489 RPM — .0035" Feed
G. Knurl
H. Cut off — 489 RPM — .0035" Feed

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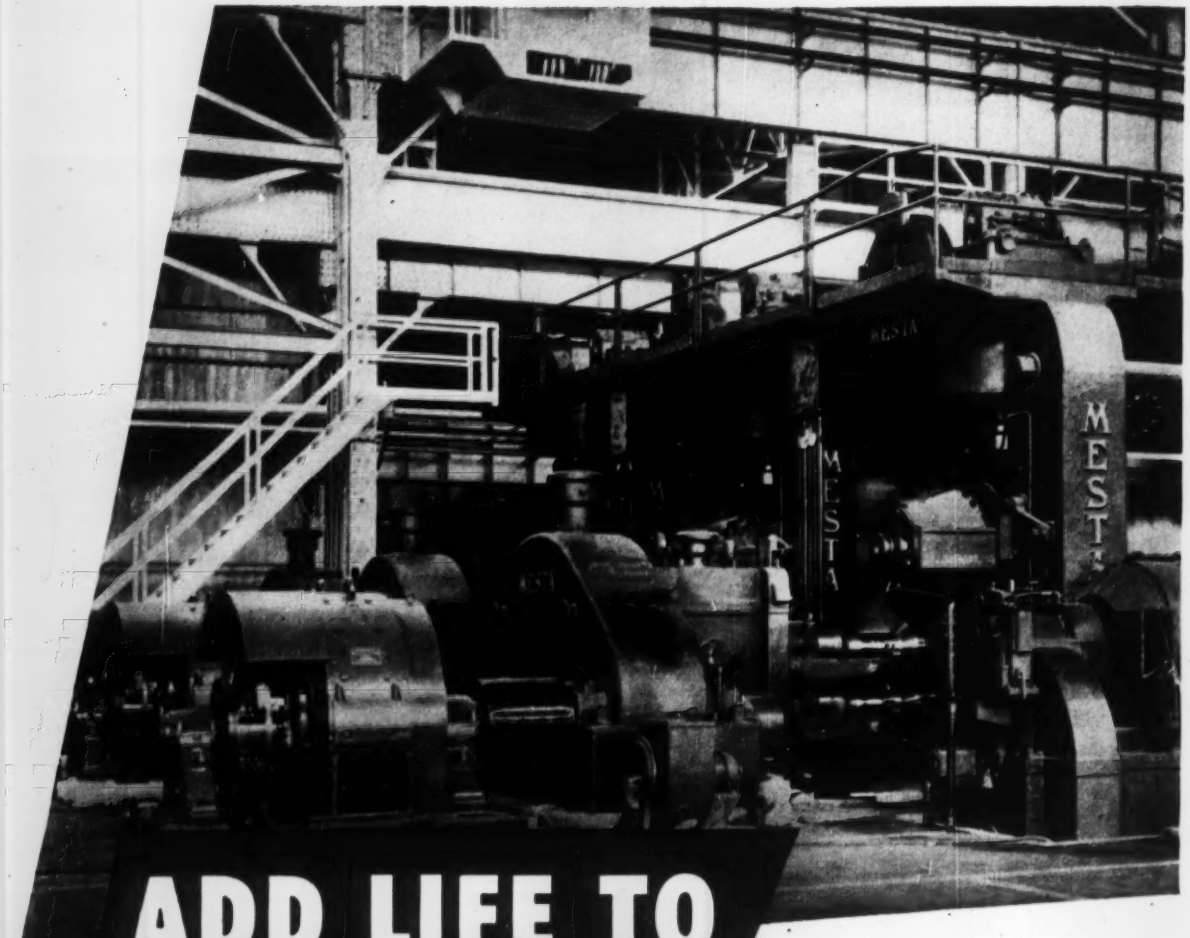

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TUNE IN: TEXACO STAR THEATER starring JIMMY DURANTE or DONALD O'CONNOR, on TV Sat. nights. METROPOLITAN OPERA radio broadcasts Sat. afternoons.

Profits Improving

Manufacturers' profits in 1954 look like they'll surpass 1953's slightly. In the first nine months this year, 498 companies reported net income of $4697 million, compared to $4691 million for the same period of 1953. The excellent fourth quarter this year, compared to the indifferent one last year, will mean moderate gains in 1954 over 1953.

$1250 Million for Handling Equipment

Materials handling equipment makers expect to do $1250 million in business in 1954. That's exclusive of equipment for construction and dirt moving. Volume in 1955 should be 10 per cent higher. Firms like Chain Belt Co. point out that the industry now offers a line of 300 to 400 separate types of equipment. Elwell-Parker Electric Co. believes that helping business next year, particularly for trucks, will be the host of new leasing and time-payment plans being offered by manufacturers.

Automation, the Answer

By the end of the next decade this country will be consuming products at double the present rate—and doing it with an "available work force" only 11 per cent greater than today's. So says John J. Rudolf, supervisor of automation for Minneapolis-Honeywell Regulator Co. To maintain today's standard of living through 1964, he believes, we need substantial increases in productivity to keep pace with the expected rise in the nonworking population resulting from higher birth rates, greater longevity and earlier retirement. Automation is the answer, he thinks, and he sees a mechanization gain far more pronounced in the next 10 years than in the past 25. The durable equipment of American business increased by 103 per cent from 1928 to 1953. In production industries the increase was about 144 per cent; output per worker climbed about one and a half times.

Mr. Wilson and Kohler Co.

Defense Secretary Charles E. Wilson is in the CIO's doghouse again. This time it's because of his department's award of a $2-million ammunition contract to Kohler Co., Racine, Wis., now in the ninth month of a strike. Emil Mazey, UAW's secretary-treasurer, says Defense is "participating in strike-breaking and union-busting activities."

Absenteeism: $9-billion Expense

Absenteeism resulting from sickness and accidents costs American business an estimated $9 billion a year or about $1275 every second. That cost to business comes from an estimated 400-500 million man-days lost every year from temporary disability. To help reduce those losses, the Small Business Administration has a new booklet, "Health Maintenance for Greater Efficiency." It deals with problems of providing health services, costs of company aid and pertinent management problems.

Dow Leases Magnesium Plant

Dow Chemical Co. signed a three-year contract with General Services Administration to operate the government-owned Velasco, Tex., primary mag-

nesium plant. Thus ends a long squabble about the fate of the facility. Dow wanted to buy it, but the Justice department's Antitrust Division said "no."

Titanium Prospects: Better

Titanium prospects are looking up, despite consumption this year of only 1200 tons of sponge compared with production of about 5000 tons. The remaining output has been going into a working inventory owned by the U.S. But quality is improving and prices are going down. And companies like Republic Steel Corp. and E. I. du Pont de Nemours & Co. show their confidence in dollars and cents. Republic will develop a rutile deposit in Mexico (p. 27). Du Pont is dickering with the government for construction of a 7500-ton titanium sponge plant at Waverly, Tenn. The company already has one sponge plant at Newport, Del., with an annual capacity of 3600 tons.

Being Neighborly

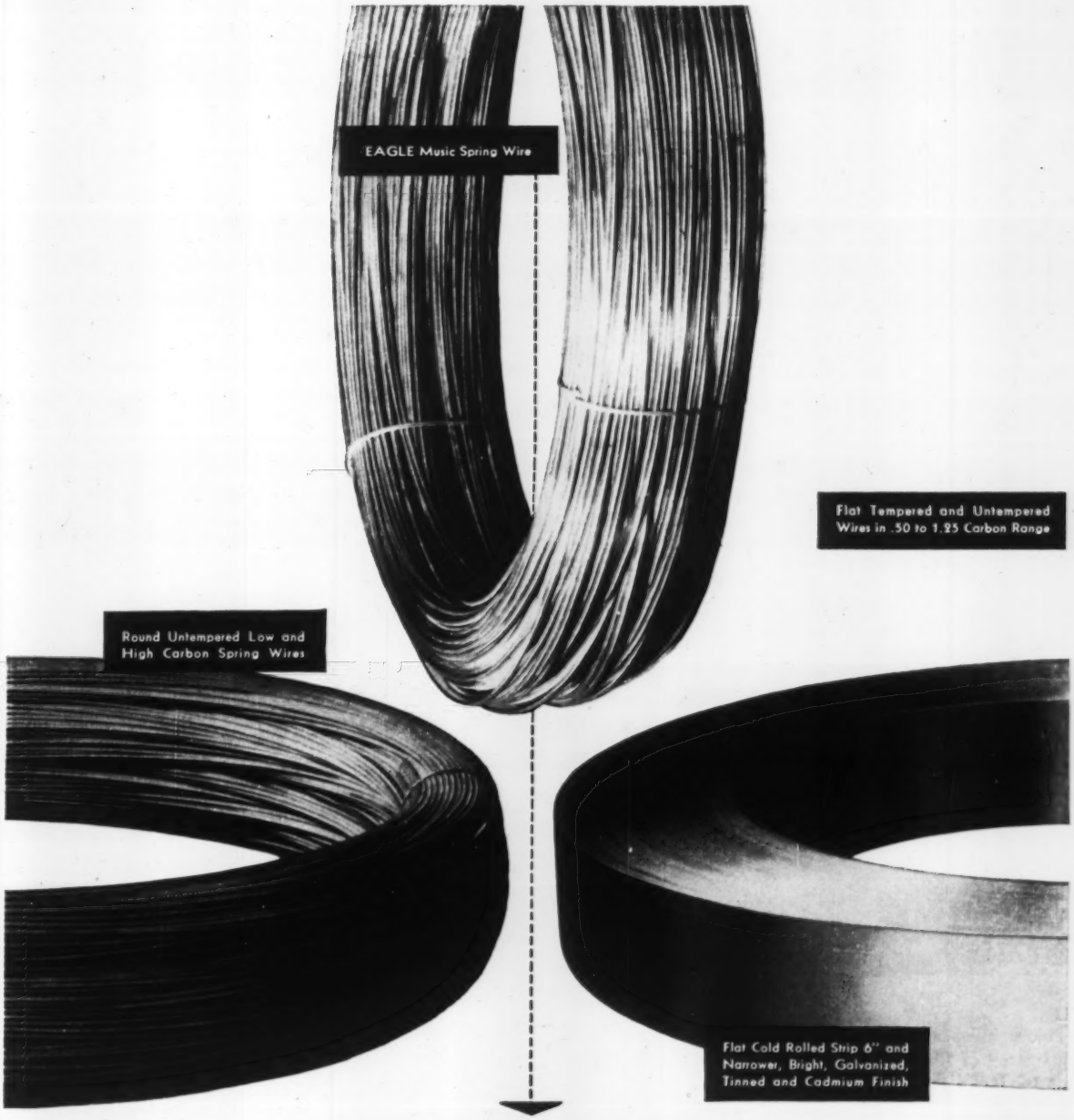
Try co-operation with a neighbor company as one avenue for cutting costs in 1955. Alter Co. and Nichols Wire & Aluminum Co., side-by-side Davenport, Iowa, firms, have a 50-50 agreement for the use of a spectrograph. Both have operations requiring spectrograph analysis but neither has a full-time need for the equipment. Total investment for the facility will be about $20,000, and each firm will share equally the maintenance and repair costs. The spectrograph will be in Alter's laboratory.

Straws in the Wind

Odds are against McLouth Steel Corp. being sold, even though several other steel companies have shown interest in buying it . . . Optional auto equipment—power window lifts, power steering, power brakes, power seats and air conditioning—will mean sales of more than $1.6 billion in 1954 . . . Of the United Steelworkers' 1.2 million members, an estimated 180,000 are unemployed and 150,000 are working less than 40 hours weekly . . . Still undetermined is who will operate the new 8000-ton extrusion press built by Loewy-Hydropress Inc.; Kaiser Aluminum & Chemical Corp. was originally scheduled to operate it at Halethorpe, Md., but the Air Force says Kaiser may be replaced . . . The number of "radar" speed-determining sets used by state and city police has increased to 834, a 46.8-per cent gain since last Apr. 14.

This Week in Metalworking

The supply outlook for industrial fuels this winter is the best since World War II (p. 30) . . . Fifteen Fresno, Calif., steel users are trying a cooperative steel-buying plan (p. 31) . . . Diesel engine sales promise to climb next year, largely because of booming construction (p. 32) . . . New markets are ahead for powdered metal parts (p. 33) . . . Malleable iron volume should gain in 1955 (p. 37) . . . The coal-steel pact signed between Great Britain and six neighbors on the continent will co-ordinate common policies in the production and sale of the two commodities (p. 38).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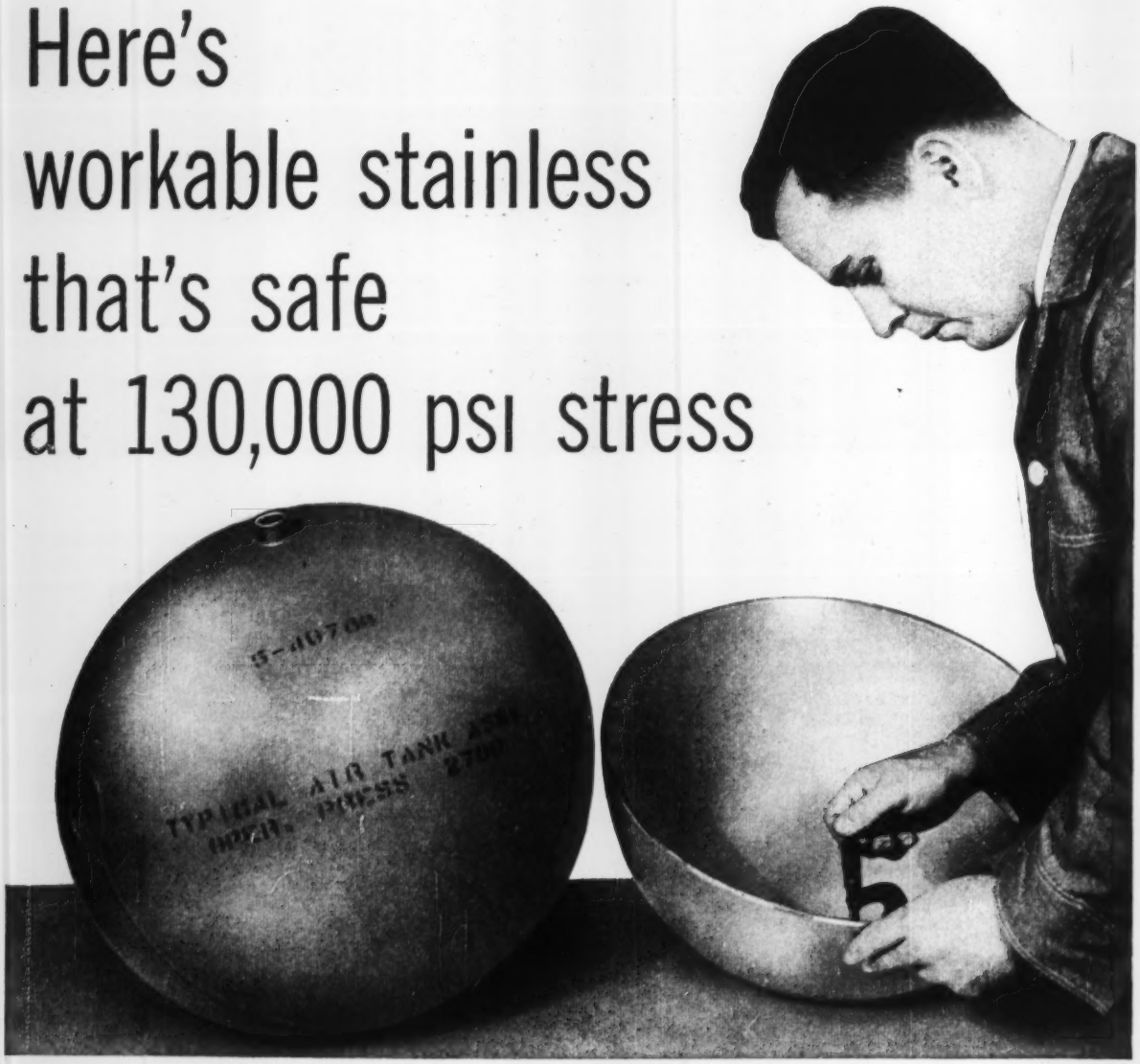

This stainless steel pressure vessel operates under an average stress of 130,000 psi . . . is tested at a calculated stress of 169,000 psi.

Of course, the shell is constructed of a special stainless steel—Armco 17-7 PH—a precipitation-hardening type made only by Armco. The two halves are readily drawn and welded while the steel is in the annealed condition. The finished assembly is then hardened by double precipitation-hardening heat treatment.

This is the procedure for hardening Armco 17-7 PH. It is first held at 1400 degrees F for 1½ hours, then cooled to 60 degrees F or lower. After that comes a second heat treatment at 950-1050 F for ½-hour and air cooling.

WELDS STRONG TOO

The result of this double heat treatment is a minimum yield strength of 150,000 psi and tensile strength of 180,000 psi or higher. Welds have this same strength when made by the inert-gas shielded-arc system.

If you need a stainless steel with easy workability, high strength, endurance and fatigue resistance, write for information on the Armco Precipitation-Hardening Stainless Steels. Besides Armco 17-7 PH there is the single heat treatment precipitation-hardening bar grade, Armco 17-4 PH.

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For Titanium: New Horizons

In 1955, rutile will be flowing from Republic Steel's newly opened, rich deposits in southwest Mexico. They could be as important to titanium as the Mesabi range was to steel when the Merritt brothers discovered it in the 1880s.

Titanium is one of the commonest metals on the earth's crust—and one of the most useful. It weighs little more than half as much as steel. It's as strong as stainless steel. Corrosion resistance is excellent. It retains its physical properties at temperatures up to 800-900° F.

Ninety per cent of the metal goes into military aircraft. Two promising models in the design stage reportedly will be 80 per cent titanium. And the list of nonmilitary applications is growing.

Nobody expects titanium to become the universal metal. But, it is finding a place in the family of metals. By 1960 defense needs are estimated at 100,000 tons. That's 20 times 1954's production of 5000 tons.

The big problem is price. Sponge sells for $4.50 a pound, bars for $9 and sheets for $15. So, work is actively going on in several directions to develop improved, lower-cost methods.

Most titanium sponge is made by the Kroll process, using magnesium in the reduction process. In 1956, Union Carbide's Electromet division will complete a plant using sodium in place of magnesium to convert titanium concentrates to sponge.

Sponge is tricky stuff to handle. At high temperatures, it is contaminated by refractories. So, it must be melted in water-cooled copper crucibles in a vacuum or in an argon or helium atmosphere.

Much of the metal comes from the more plentiful but lower content ilmenite sands. It can be made cheaper from rutile.

Have no doubt that titanium's technological problems will be licked, just as they were in steel and nonferrous metals. The important thing is: America now has on tap a plentiful, lower-cost source for a most useful metal.

Irwin H. Such

EDITOR

DOLLAR CONFIDENCE: American industry has bet $115 billion since 1946 that the country's economic future will be bright. Indeed the size of the wager alone will assure a measure of prosperity.

The Commerce department estimates manufacturers spent $115 billion for additions to production facilities and working capital from 1946 through mid-1954. That's far in excess of any prior comparable period. It comprised roughly half the new capital utilized by all nonfinancial corporations in the 8½-year span. Close to two-thirds of manufacturers' postwar outlays went for plant and equipment, while about 25

per cent was spent for higher inventories. The extension of consumer credit lines accounted for most of the balance.

Of that $115 billion, $48 billion came from retained earnings, $15 billion from added long-term indebtedness, nearly $4 billion from new stock issues and the remainder from depreciation allowances and other sources.

READY FOR THE WORST: Defense Secretary Charles Wilson last week announced a slowdown in draft calls and a contemplated 400,000 cut in Armed Forces personnel. One reason for the announcement: "The relative danger of war is lessened."

While that's excellent news, we wonder what effect it'll have on the already lagging plans by industry to prepare for emergency or disaster.

This problem has grown up in our thinking as something that will happen only in wartime. Anyone in industry knows that disaster can strike anytime.

Students of disaster planning advise that: Personnel handling disaster plans must be assigned and trained well in advance; one man must head the program and make all decisions; emergency lighting equipment is needed; customers in other parts of the U. S. must be kept correctly informed as to actual damage.

A few firms, such as Koppers Co., have made elaborate preparations for emergency, figuring that it's the kind of insurance that's expensive only when you need it but don't have it.

They're ready. How about you?

LEGAL AID: With the aid of Federal Judge Herbert S. Boreman, the Follansbee Steel Corp. legal tangle has finally been resolved to the reasonable satisfaction of most of those involved.

Frederick W. Richmond of New York was permitted to buy Follansbee assets, with the understanding that he was to sell the properties to Cyrus Eaton, Cleveland financier, who will operate them in Follansbee, W. Va., for at least three years. In a separate deal, the corporate shell of Follansbee is to be merged with two firms controlled by Clint W. Murchison of Texas.

Industry participates in a lot of court battles in this highly litigious age—probably too many. But a look at some of the famous cases recently—the Dupont monopoly matter and the steel industry seizure litigation are examples—reveals that the participants from industry are for the most part faring well at the hands of the nation's courts.

CLOTHES MAKE THE METAL: For a long time we've regarded tinplate and galvanized steel as basic materials. We've made capital of their formability, their resistance to corrosion, the ease with which they can be soldered.

But a growing family of precoated steels and nonferrous metals is waiting for new business. Available are copper, zinc, nickel, nickel-chrome, brass, tin, lead-tin and organic film coated metals, each with properties that neither base metal nor coat possess alone.

Copper coated strip recently solved a drawing and plating problem for a flashlight maker (p. 60). A gasket maker found new economies through the use of a one-side nonferrous alloy coating. The brilliant tarnish-resistant finish of electro nickel-chrome coated strip made it a favorite of an appliance maker.

These are materials you will hear more of as other manufacturers turn to them to cut production corners.

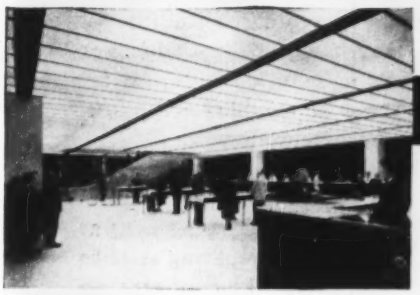
GROWTH INDUSTRY: Before 1939, hardly a person outside the laboratory understood the term "electrolytic manganese."

In that year, the first commercial production of that metal in this country was undertaken by Electro Manganese Corp., Knoxville, Tenn. Offering less than 50,000 lb to an uncertain market, the company found it necessary to increase capacity almost from the start. By late 1953 it was producing at nearly a 15-million-lb-a-year rate. Capacity and production were synonymous.

As advantages of high purity (99.9-plus per cent) became known, the use of electrolytic manganese grew, first in the nonferrous alloy field and then as an additive for stainless and alloy steels.

This month, Electro Metallurgical Co. opened electrolytic manganese capacity of 12 million lb at its Marietta, O., plant (p. 99), to hike the nation's total capacity to 27 million lb.

Although there are only two companies in the field, they have carved out a new industry.



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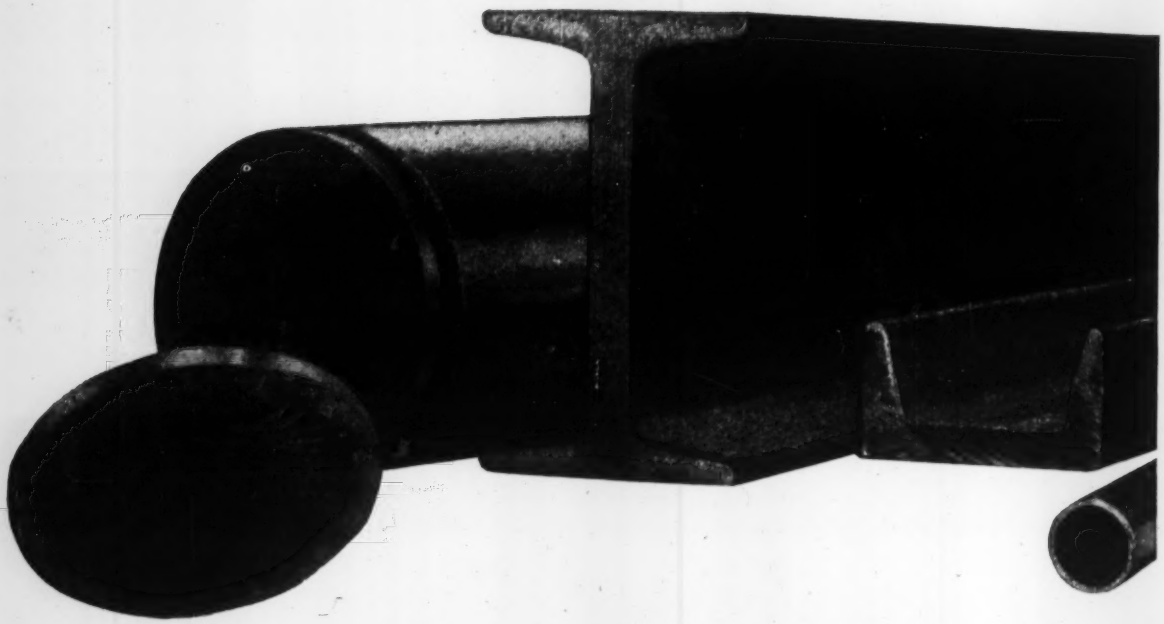

What do steel inventories REALLY cost?

You might be shocked to find how fast the hidden costs of carrying steel inventories add up! We know because steel inventories have been our stock in trade for over a hundred years.

But you don't *have* to tie up plant space and capital in steel you won't use for many weeks—may never use if products or markets change quickly. You don't *have* to lay out cash for cutting and handling equipment, incur unnecessary scrap loss, or divert manpower to unproductive inventory work.

Instead, you can hold your own inventories to a practical minimum and draw on Ryerson inventories as current requirements arise. At Ryerson you have the world's largest stocks at your disposal—plus unequalled facilities for preparing steel to your order—so you can get delivery of any kind of steel in practically any quantity, within a few hours.

That's why we urge you to consider *all* your costs when setting inventory policy. And let Ryerson help you release more of the money in steel inventories for profit-producing opportunities. Our inventory experience is at your service.

RYERSON STEEL

Principal products in stock: bars, structurals, plates, sheets, tubing, alloy and stainless steel, reinforcing steel, etc., also machinery and tools

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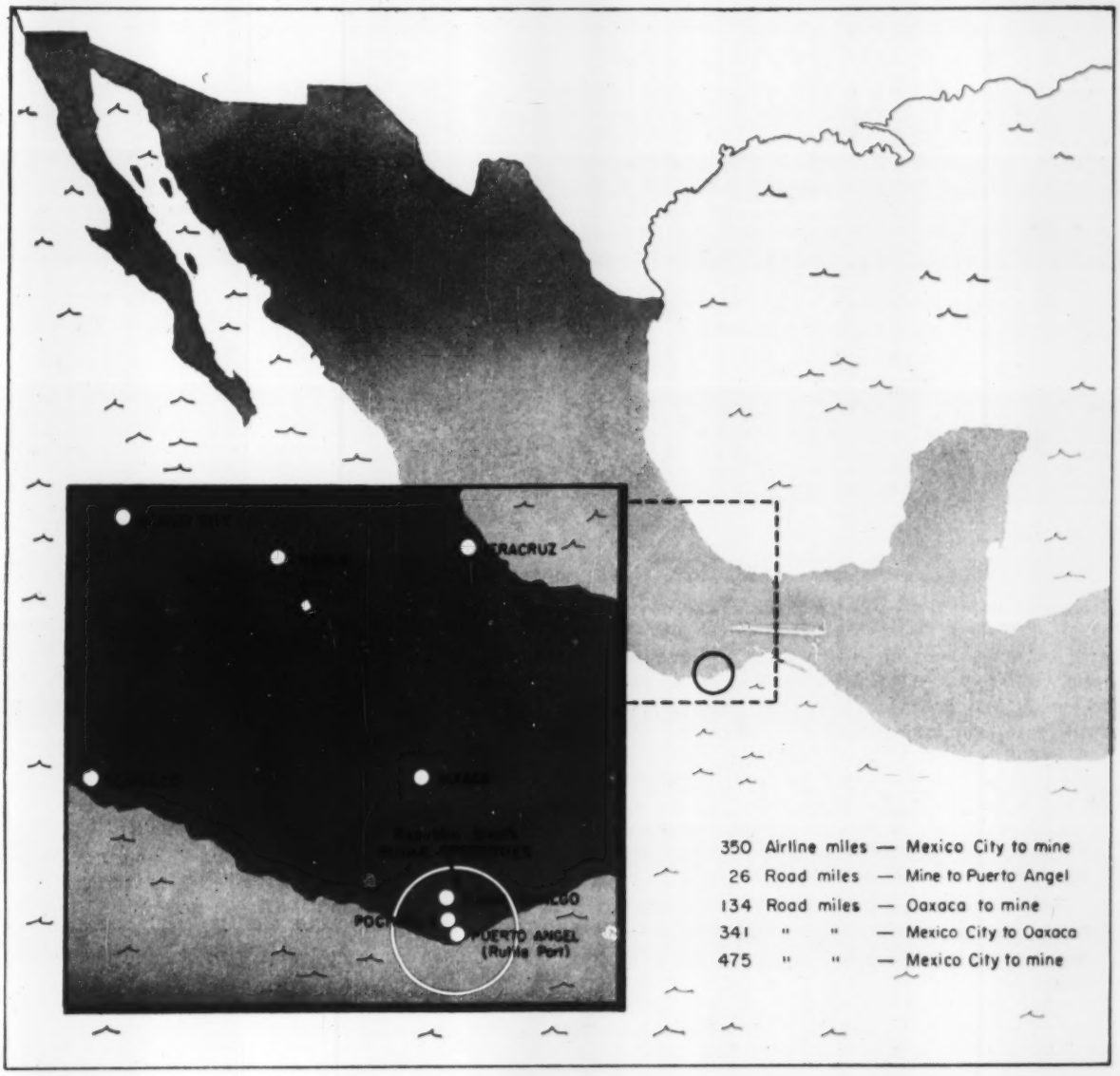

VERACRUZ
PUERTO ANGEL
(Rutile Port)
350 Airline miles — Mexico City to mine
26 Road miles — Mine to Puerto Angel
134 Road miles — Oaxaca to mine
341 " " — Mexico City to Oaxaca
475 " " — Mexico City to mine

Titanium for Everyone: Republic's Rutile Points Way

IN THE FALL OF 1953, three men worked their way into the primitive back country of southwest Mexico—where automobiles had never been seen, where light trucks and jeeps got through with difficulty in the dry season, where in the autumn rainy season water sluiced chunks of the narrow roadway down into the arroyos thousands of feet below.

But the hardships paid off for Republic Steel Corp.'s mining consultant, Donald B. Gillies, and his aides, Ward H. Broadfield and Willis A. Seaman. Their reward was the richest strike of titanium-bearing ore in the Western Hemisphere—perhaps in the world.

Rich Rutile—It's rutile (with a titanium dioxide content as high as 97 per cent) from which titanium can be extracted more readily than from ilmenite (which contains 26-28 per cent titanium dioxide).

Republic's properties are in the state of Oaxaca two miles from the tiny village of Pluma Hildago. That's about 350 air miles from Mexico City and 12 miles inland from Puerto Angel, a Pacific Coast fishing village and coffee shipping port. By road, they are 475 miles from Mexico City and 26 from the port. By water to the Panama Canal it's 1226 miles.

Rich Reserve—Las Minas de Tisur, the mine that goes into operation before the end of the year, has proved reserves of 25 million tons of rutile. It's only part of Republic's 38 claims comprising a

Thirty five miners are working Republic's rutile mine. Later there'll be 500 to 800

strip 6 miles long by 1½ miles wide. Outcroppings indicate countless additional millions of tons of rutile ready for exploitation.

Claims now held by Republic were passed up by other major companies. Apparently, this was due to the ruggedness of the country and earlier skepticism over titanium's future. But, it's now established as a commercial metal. Production this year will be 5000 tons. Requirements by 1957 will be 35,000 tons. Other American and Mexican interests are working in the area to establish claims.

Hand Labor—The Tisur vein lies along the face of a 4500-foot mountain. Manager Broadfield used hand labor to shave off the top of this mountain for a camp site. The first exploratory tunnel, Adit No. 1, was driven into the vein at an elevation 300 feet below the camp. At a depth of 300 feet the tunnel still was in ore. Cross cuts right and left indicated width of the vein at no less than 75 feet.

Two more tunnels were driven 100 and 200 feet farther down. Thirty-five miners working two shifts are driving Adit No. 4 at a point 100 feet below No. 3. Diamond core drilling at No. 4 indicated vein thickness of over 230 feet. A vertical hole 91 feet deep remained in ore.

Equipment Coming — Republic mining men are rushing to get equipment to the mine and concentrator site before the rainy season resumes.

It is expected that Adit No. 4 will be used as the main entry. Ore from Adits 1, 2 and 3 will be dropped down a vertical shaft to No. 4. From that point, the ore will be carried by conveyor belt a half mile down the mountain to a concentrating plant. The ore will be crushed to 60-80 mesh, then washed to bring the TiO_2 content up to 95 per cent. The initial unit will have capacity of 2000 tons of concentrates a month. Planning provides for additional units when needed.

Diesel Power — Hydroelectric power could be developed. Republic figures it's better to start out with diesel-driven generators, for a newly completed products pipe line at Salina Cruz 112 miles down the

In 1955, rutile ore will be flowing from this main mine entry

coast makes fuel available at low cost.

The Mexican government has promised to improve the road to Puerto Angel for 7-ton trucks. Republic will have to build a 6½-mile connecting road. The government also intends to rebuild and extend the dock.

The concentrate probably will be shipped in drums or boxes. Thought also is being given to construction of elevated storage bins so the material can be dropped by conveyor directly into ship holds.

Where It Will Go.—President Charles M. White says Republic has no present plans to build a titanium sponge plant. That's the only missing link in completely integrated production at Republic. It has complete facilities for melting sponge and converting it into finished products at Canton and Massillon, O. So, the concentrate probably will go to Du Pont and others with sponge plants. Crament Inc., Crane Co. subsidiary, will have a new plant ready in mid-1955; Electromet, one in the fall of 1956.

What It Means—There'll be less dependency on Australia and other foreign countries, important in an emergency. Adequate supplies will be available for aircraft and missile production and growing civilian applications.

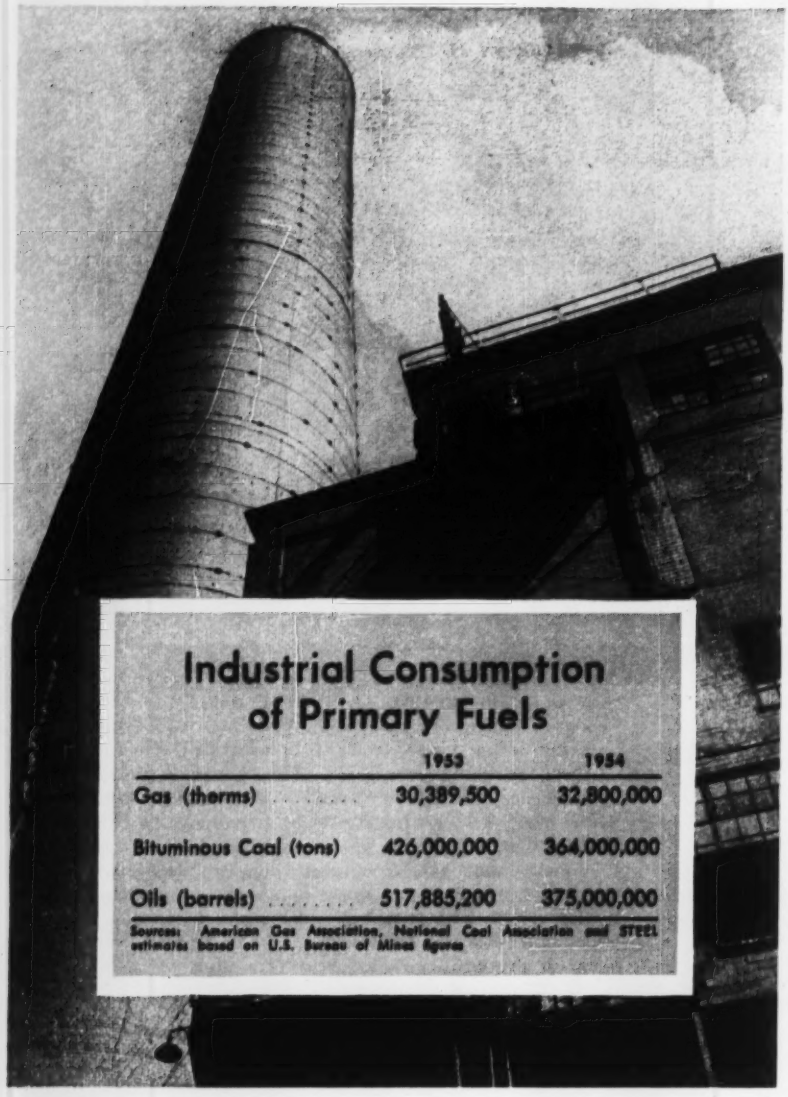
The cost of the metal could be reduced—perhaps as much as $1 a pound.

DON GILLIES—YOUNG MAN WITH A PICK: At 82, Republic's mining consultant climbs the sharp slopes and trots the coffee pickers' trails at a pace that exhausts men half his age. Once a steel company president (Corrigan-McKinney, 1932-35), mining is his life and love. Every likely rock he finds will feel the impact of his geologist's pick.

Formally retired as a Republic vice president seven years ago, Mr. Gillies continues active as a mining consultant. In the late 40s he investigated and brought to Republic's attention the rich iron ore deposit in Liberia. He uncovered a mining property in Mexico, near Vera Cruz, which remains undeveloped, investigated iron properties in Venezuela, and more recently uncovered an iron ore deposit in Peru, now being explored.

Equipment will move to the mine over roads like this

Sleepy Puerto Angel soon will be a bustling ore port



Industrial Consumption of Primary Fuels

	1953	1954
Gas (therms)	30,389,500	32,800,000
Bituminous Coal (tons)	426,000,000	364,000,000
Oils (barrels)	517,885,200	375,000,000

Sources: American Gas Association, National Coal Association and STEEL estimates based on U.S. Bureau of Mines figures

Plenty of Fuel This Winter

INDUSTRY can expect a problem-free winter from primary fuel supplies, barring an unusually severe cold spell or a paralyzing snow fall. It has taken since World War II for industry to get into this comfortable position.

Beginning in 1946, the country was hampered by a shortage of pipe for new lines and a lack of bulk storage facilities. As the first snow flake of the season flittered to the ground, manufacturers could predict an impending slowdown or shutdown because of fuel shortages.

Different—Up until this year, that is.

Industrial fuel oil may be tight in spots, and consumers may have to pay more for it, but the oil refiners have the fuel available. Actually, the greatest threat of an oil shortage is the possible interruption of deliveries.

Ready To Go—Gas companies have been adding new lines at a terrific rate since pipe became available for them. This year utility and pipe line companies are spending more than $1 billion for new facilities; nearly 18,000 miles of pipe line will be added to natural gas systems.

The American Gas Association estimates the industry will spend nearly $4 billion in the 4-year period from 1954 through 1957. Underground storage pools have been established in 167 fields in 17 states, compared with only 50 such pools 10 years ago. L-P gas is now used by about 13 per cent of metalworking companies employing 20 or more employees.

Copious Coal—Coal is plentiful. The Bureau of Business Research, University of Pittsburgh, places industrial inventories, as of Oct. 1, 1954, at 68.8 million tons. That's sufficient for 88 days of operation at the September, 1954, rate of consumption. Most large industrial consumers have two months supply or more on hand. And the chief problem of bituminous operators is to maintain existing sales levels (see table for drop this year).

The fuel outlook in major consuming areas shapes up this way:

Chicago: No trouble anticipated. Demand for gas probably won't exceed last winter's volume; and if it does, there will be a bigger supply to meet it. Peoples Gas Light & Coke Co.'s new underground storage at Hercher, Ill., is in partial operation. Fuel oil refinery capacity is high, inventories large.

Cleveland: Residual fuel oil, notably No. 6 grade used in steel mills, is scarce and a nip-and-tuck supply situation is promised for the winter. This does not mean steel mills in the Cleveland-Youngstown area will be forced to shut down from fuel oil shortages. But it means they probably will pay more for their fuel this winter. Lee Corn, sales manager, East Ohio Gas Co., Cleveland, regards the outlook for industrial gas users as good. The company's storage facilities are filled to capacity, and all anticipated construction has been completed.

Pittsburgh: No coal shortage, of course. Spot gas shortages are a possibility, depending on the weather. However, trouble would be considerably alleviated by use of standby fuel oil.

New England: Industry here isn't worrying about primary

fuels. Electric utilities, largest consumers of both industrial oil and coal in this area, have plenty of these fuels on hand to help meet anticipated increases in power output in 1955. Generating capacity in New England is about 5.4 million kilowatts, up 300,000 kw this year. Introduction of natural gas into New England hasn't changed the ratio of industrial use of oil, gas and electricity so far.

New York and Philadelphia: Residual oil prices are up seasonally. But consumers anticipate no difficulty obtaining oil. Nor is coal or gas supply regarded as a problem.

Big Tool Study Coming

More expansion in elephant tool capacity and more orders for such equipment may result from a survey being conducted by the Metalworking Equipment Division of Business & Defense Services Administration.

To help the Office of Defense Mobilization make decisions, the BDSA division has sent a questionnaire to users asking them to list such large tools now installed in their plants, their age, present condition, how much they were used in 1952 (peak year of Korean war production) and how much Army, Navy and Air Force work probably would be demanded from them under all-out mobilization.

Help—The BDSA unit will use the data to formulate recommendations to the ODM on gaps that may exist in the present inventory of super-elephant tools and action that may be taken to fill them.

It is likely that a need may be revealed for building up a government-owned reserve of super-elephant tools.

What's Involved—The tools covered in the survey are: 16-foot diameter swing and larger vertical boring mills; 60-in. stroke and larger vertical slotters; 120-in. width capacity and larger planers, special planers and plane-type millers; 30-in. and larger plate edge-type planers; 7-in. diameter spindle and larger horizontal boring machines and equivalent size post millers; 48-in. stroke and larger draw-cut shapers; 72-in. swing and larger lathes; 120-in. arm and larger radial drills; 48-in. diameter and larger cylindrical grinders; 72-in. diameter and larger gear generators, hobbers, shapers and shavers; 2000-ton and larger forging presses; 1500-ton and larger presses for straightening rounds; 5000-ton and larger presses for straightening flats; 2-in. x 20-foot and larger bending rolls; 500-ton and larger cold-forming press brakes; and 6 x 6 x ¾-in. and larger vertical roll shapers.

McLouth Makes Oxygen Steel

Oxygen steelmaking made its American debut last week when the first heat of mild steel was poured at McLouth Steel Corp.'s Trenton, Mich., plant. Heralded as a leading contender for production honors in future steelmaking years, the process now has a foothold in both Canada and the U. S.

The three-vessel shop will ultimately produce 1500 tons per day. Some 40 tons of steel can be refined in a 20-minute oxygen blow.

New England Gains Steel Mill

The newly organized Northeastern Steel Corp., which will take over the steel-strip plant of the Stanley Works, Bridgeport, Conn., will produce hot-rolled specialty steels for the New England area. Walter P. Jacob, chairman and executive officer of the new company, says. Ingot capacity of the Bridgeport mill will be upped from 188,000 to 300,000 tons a year, electric furnaces will be added to the open-hearth operation and products will be diversified through production of carbon and alloy bars.

Steel Buyers Try Co-op

SAN FRANCISCO area steel warehousemen aren't too excited over a co-operative steel buying venture under way in Fresno, Calif.

Formed as the Co-operative Steel Supply Co., it so far has been successful, saving its members as much as 30 per cent on some items, according to its spokesman.

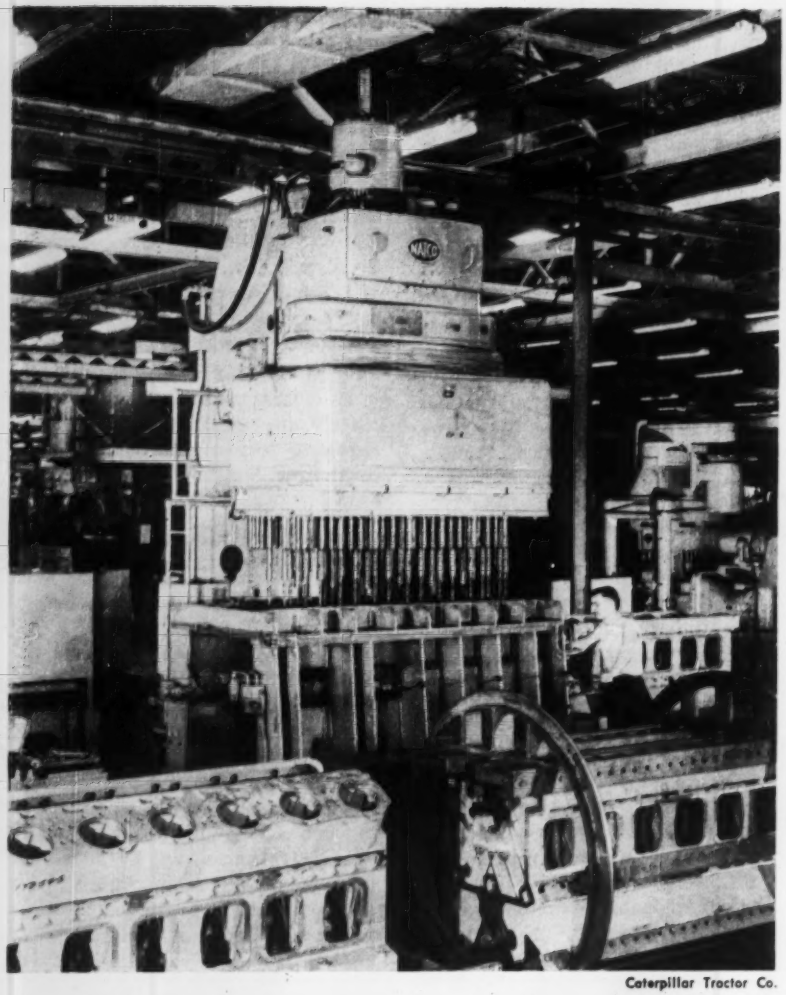
Why?—The savings come through elimination of salesmen, collection problems and (probably) because the organization is not paying rent.

The co-operative has 15 members, but would like more—probably as many as 50—so it would have more capital to buy.

How It Works—Through a pooling of orders, it is able to buy carload lots, by-passing the steel warehouses. The collection problem is eliminated because members put up a cash deposit.

The co-operative, organized about five months ago, has purchased five car loads of steel materials from Oregon Steel Mills in Portland.

But its biggest problem, of course, in the viewpoint of warehousemen, will be its inventory situation. Warehouses, similar to department stores, have to carry a multitude of items, to satisfy the smallest needs of the smallest customer at a time he wants it.



Caterpillar Tractor Co.

Need for more roads, more electric power means . . .

More Diesel Power Ahead

DIESEL ENGINE manufacturers are hoping two plus factors—the anticipated boost in roadbuilding and continued growth of electric power needs—will drive sales upward in 1955.

Diesel engine sales this year ranged from a 10-per-cent increase over 1953's for some producers to a near 35-per-cent drop for others. Over-all, sales are estimated at about 10 per cent below 1953's $227 million. Some 118,000 units were produced in 1953, compared to 121,000 in 1952.

Varied — Diesels range in size from 5-1/12 hp to over 10,000 hp and have many uses—from small portable generators to huge marine and power generating units. Bulk of the engines produced, however, are in the 51 to 300-hp bracket.

Earthmoving equipment takes a big percentage of the diesel engines produced. That's why President Eisenhower's proposed $50-billion roadbuilding program (STEEL, Oct. 18, p. 49) plays such an important part in the diesel engine makers production plans. One example: International Harvester, Chicago, says it will have a new line of off-highway trucks powered by diesel engines next year.

Other key markets for diesels are agriculture, logging, mining, railroad, public utility, chemical and petroleum industries.

Potentials — A. G. Noble, executive vice president, Nordberg Mfg. Co., Milwaukee, expects a continued growth of the nation's electrical load and, hence, increased sales of diesels for public and private generating plants. Natural gas transmission also offers a large potential market, and Nordberg is aiming at it with its new high compression, spark-ignition engine. It has a built-in speed-increasing gear for centrifugal gas compressors.

A factor which helped boost this year's sales over 1953's at Fairbanks, Morse & Co., Chicago, has been the increase in competition on the nation's industrial scene, says C. E. Dietle, diesel sales manager. He adds: "The emphasis on cost-cutting has brought out to many companies the advantages of diesel power."

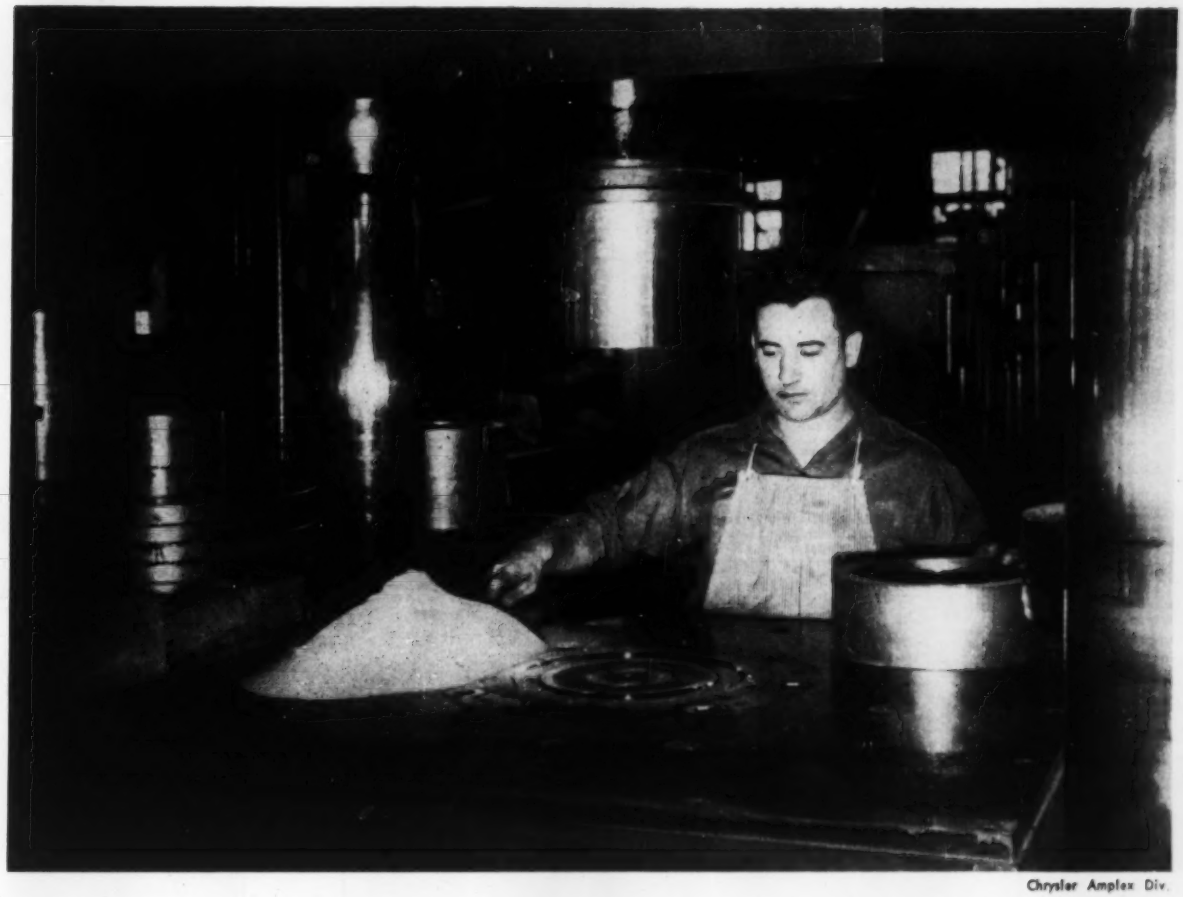
Powerful—Private industry continues to be a major market for generating units. Reports that industry is using fewer plant generating units and shifting to commercial power aren't justified by sales figures, officials point out.

Rule of thumb: "When a company's power bill ranges from 15 to 25 per cent of all operating costs, then it'll pay the company to investigate the possibilities of installing their own plant generating unit."

Foreign Sales—Exports play a major role in diesel engine sales, with companies reporting 25 to as much as 50 per cent of this year's output going this way. Canadian sales lagged this year, but European and South American markets generally showed an increase. None of the manufacturers responding to STEEL's survey reported competition from imports.

About half of all diesel engines produced stay within the producing company's organization for installation on other products. Engine sales to outside consumers are handled through company representatives on the larger units and through distributors on some of the smaller engines.

Diesel makers, like many other manufacturers, did some distribution streamlining in 1954. More is expected in 1955.



Chrysler Amplex Div.

Pressure on costs, big research programs promise . . .

New Markets for Powder Metals Parts

NEXT YEAR'S STAR salesman for powder metal products will be customer cost - consciousness.

There was a bigger than normal lift in business in third quarter, 1954, and industry forecasts, which see this trend continuing, range all the way from 10 to 50 per cent more sales in 1955. Estimates vary about the size of the powder parts industry, but sales in 1954 have probably hit $250-$275 million.

Predictions — Powder metal products sales usually follow metalworking's lead. This year, total business will be off about the same 10 per cent estimated for metalworking. George Bachner, manager of the Powder Metal Products Division of Yale & Towne Mfg. Co., believes that his division will gain about 10 per cent in sales volume this year. For 1955, he's looking for a 50 per cent increase, due to intensive sales engineering campaigns and updated production equipment.

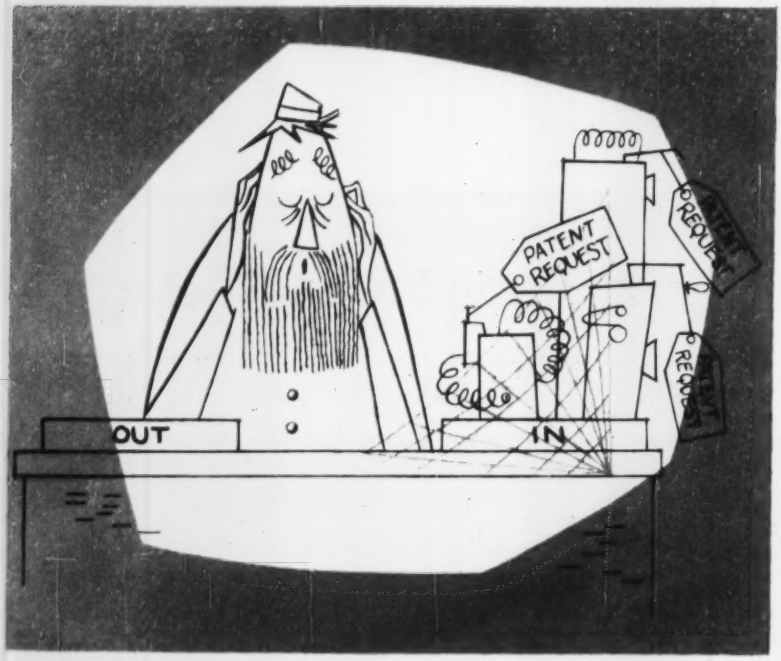
Producers' Picture — B. T. du Pont, sales manager of Plastic Metals Div., National Radiator Co., observes: "1955 will be a highly competitive year because of excess domestic productive capacity." Although reported capacity exceeds usage by four or five to one, about 42 per cent of total estimated 12,420 net ton iron powder shipments in 1954 were imported.

"This carrying of coals to Newcastle," remarks Mr. du Pont, "is largely because compacting dies, tools and practices have been designed around foreign powders."

Progress — Technologically, tremendous progress is being made by fabricators. Sheet and wire from powder are new on the scene. Larger structural parts are being made and there's a new development every day in titanium, aluminum, high-density iron, special purpose and high-temperature powder products.

Just a few of the many companies with big research programs are Westinghouse Electric Corp., Vanadium-Alloys Steel Co., Aluminum Co. of America, Brush Development Corp. and Amplex Div., Chrysler Corp.

By E. C. KREUTZBERG Washington Editor



As dust collects on applications, experts recommend . . .

Electronic Aid for Patent Office

It will try electronic computers to whittle down the present backlog of some 204,000 applications. More inventions, more complex technology cause the delay

AN INVENTION—the electronic computer—may help the Patent Office unsnarl one of its own problems.

A committee headed by Dr. Vannevar Bush recommends its use to speed up processing of applications. His group, recognizing that complete changes can't be effected overnight, advises a modest schedule, starting with one category and gradually working into others as the equipment and its techniques become familiar.

Background—With a backlog of about 204,000 applications, it takes the Patent Office an average of three and a half years to go from application to patent. The situation is tough on any business depending on inventions and patent ownership, particularly the small ones attempting to build up on a single invention.

Patents take so long to be issued because an examiner must study everything that has gone before to decide whether the invention is new. That search for the prior art becomes more complicated and time-consuming every day as technological progress speeds up.

More Complicated—The productivity of the examiner is going down. The Commerce department, in whose bailiwick the Patent Office falls, foresees that the search task will become ever bigger, broader and more time-consuming because of increasing research, additional inventiveness and the accumulation of more and more published material.

The Patent Office has about 622 examiners, and it's estimated that over half their time is devoted to search for prior art. If, say, half that work could be done on electronic brain machines, the results would be equivalent to adding 155 examiners without costing taxpayers any more money.

Expediters — Commerce Secretary Sinclair Weeks has appointed several men to help Dr. Bush study ways to improve patent processing: Dr. A. V. Astin and Dr. Samuel N. Alexander, National Bureau of Standards; Rear Admiral Luis de Florez, U. S. Navy (ret.), de Florez Engineering Co.; John C. Green and Albert V. Morris, Office of Technical Services; Dr. Alan T. Waterman and Norman T. Ball, National Science Foundation; Dr. Warren Weaver, Rockefeller Foundation; Dr. Karl F. Heumann, National Research Council; L. Quincy Mumford, Library of Congress; and C. F. Van Aken, Bureau of the Census. In addition, a committee of technicians from the Patent Office has been delegated: Don D. Andrews (chairman), M. C. Rosa, B. E. Lanham, S. W. Cochran, J. Leibowitz and M. F. Bailey.

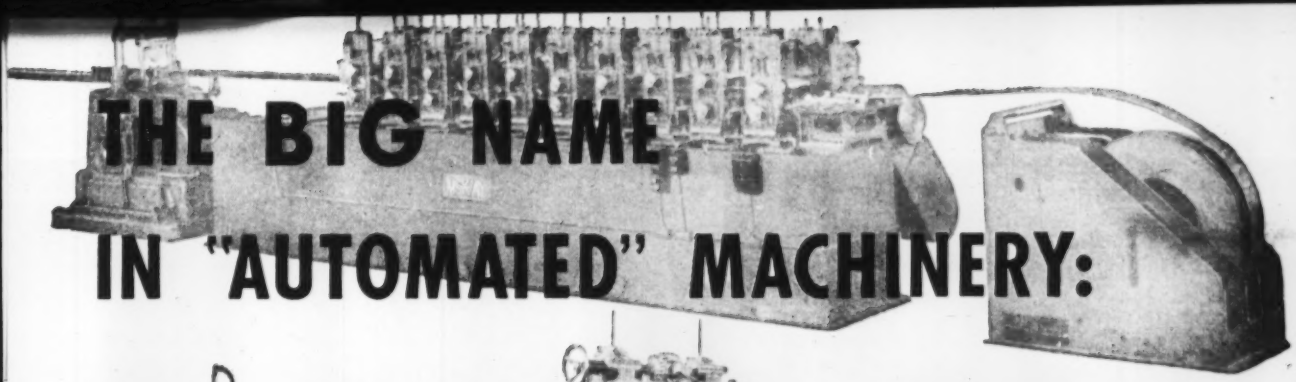
1954: Industry's Safest Year

American industry will chalk up a new safety record this year, predicts Labor Secretary James P. Mitchell. The Bureau of Labor Statistics reports the all-manufacturing accident rate for the first nine months of 1954 at 11.7 injuries per million man-hours.

Previous low (1953) for the first nine months of any year stood at 13.9. Since the last three months of the year usually show a decline in injury rates, the final average is likely to be considerably better than the 1953 figure.

Nearly all metalworking classifications lowered their injury rate from last year. Those reporting decreases of five frequency-rate points or more were: Hand tools, files and saws; fabricated wire products; steel springs; bolts, nuts, washers and rivets; and screw-machine products.

THE BIG NAME IN "AUTOMATED" MACHINERY:



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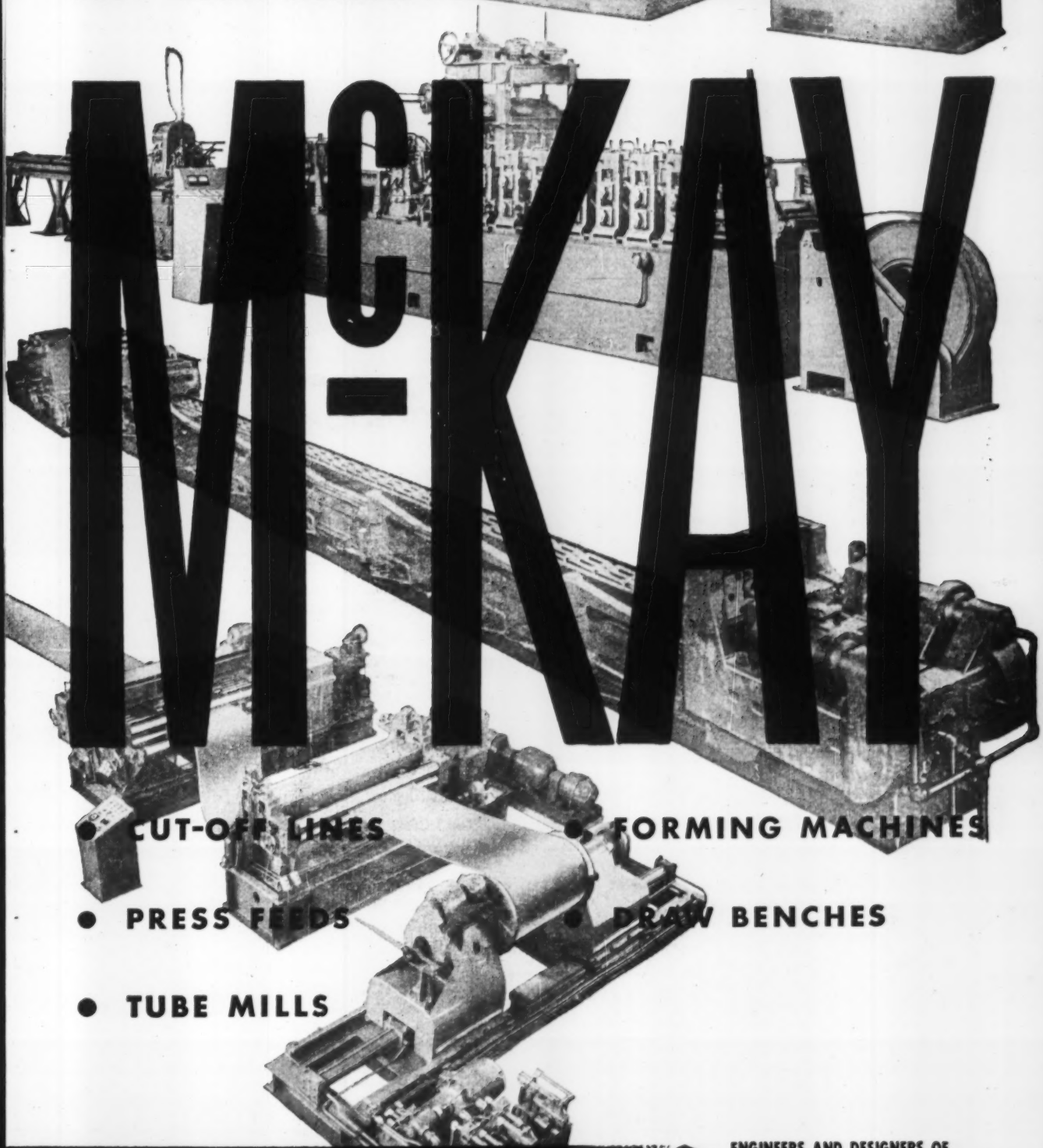

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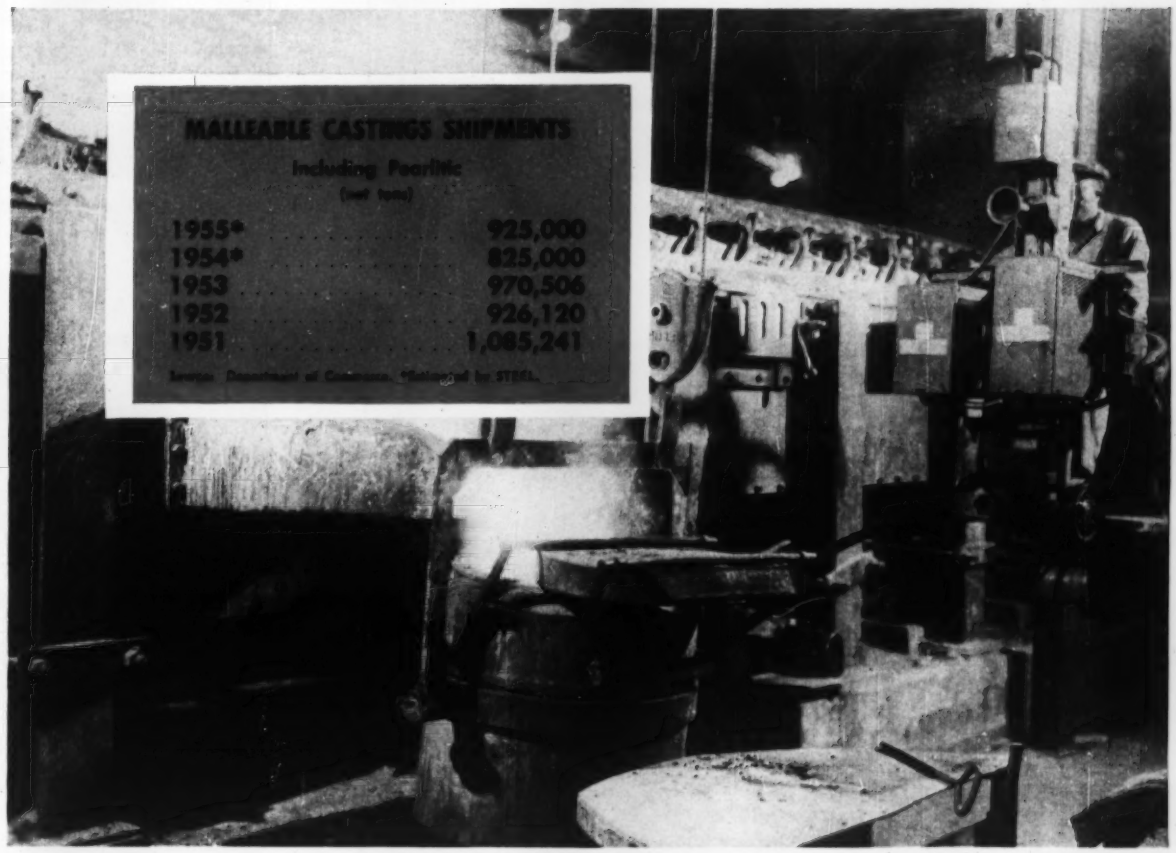

Rising auto production, general business set the stage for . . .

Bigger Jobs for Malleable Castings in 1955

MALLEABLE FOUNDERS see a modest upturn for themselves in 1955. Most predict a gain of about 10 per cent over 1954; a few think their company's operations will rise close to 20 per cent.

Rising orders are one reason for optimism. The automotive industry, which accounts for something over half of malleable consumption, is leading the way. Other users are holding their own, with a few showing signs of increasing orders.

Gains Ahead—Farm equipment figures to provide added business after the first of the year. Electrical and plumbing fittings should stay even with 1954. But little hope is held that railroad buying will pick up much before midyear.

While over-all malleable production is down, one segment is steadily moving ahead, says L. D. Ryan, managing director of Malleable Founders' Society. That's pearlitic malleable iron, which differs from standard malleable in that some of the carbon is retained in combined form. Pearlitic is generally stronger than standard malleable and has higher hardness, rigidity and abrasion resistance.

Ace in the Hole—One of pearlitic's main attractions is its hardenability. Ease of surface, local or through hardening considerably widens its applications. That's one reason pearlitic production went from 70,000 tons in 1953 to an estimated 80,000 tons in 1954. Outlook is for about 100,000 tons in 1955.

And, says J. H. Smith, general manager of General Motors Corp.'s Central Foundry Division: "I see no reason why it should not reach a quarter-million tons yearly soon."

Hard Sell—Helping expand the uses of pearlitic is a rising tide of aggressive selling in the malleable iron industry. "It is our firm conviction that the future expansion of our markets depends a great deal on the extent to which we do an aggressive job in training competent sales engineers and the skill displayed by them in helping to design components which will do a more efficient and economical job for our customers." That's the way the industry's job is outlined by C. E. Brust, president of Eastern Malleable Iron Co. and the Malleable Founders' Society.

About pearlitic, Mr. Brust says: "We do not feel that this material will replace (standard) malleable applications, but it will expand our markets into new fields."

France Actuelle

Indicator of European steel output points up

FREE-WORLD countries have much to be proud of in the recovery of world steel production (cited below) and the postwar rise of all kinds of industrial output.

Not all nations or areas of the world recouped and prospered alike, of course. Asia as a whole didn't make the gains that Europe did, partially because American aid was concentrated on Europe where the Communist threat seemed more immediate.

Different Now—With Europe's economies stable and its industries ready to compete for any markets, the Communist threat appears to have abated somewhat. So the U. S. is shifting its aid money and its rehabilitation interest to Asia, particularly Japan.

A country extremely dependent on foreign trade, Japan has been cut off from its markets. U. S. spending during the Korean war kept the Japanese economy afloat for several additional months.

Slipping Yen—Since the Korean emergency, however, Japan's special dollar earnings have been declining. Foreign exchange holdings were over $1.1 billion at the end of 1952, less than $1 billion a year later and less than $800 million by June, 1954.

Since early 1954, Japan has been following a deflationary program at home and a drive to increase exports. The decline in earnings has been slowed down, but the trend has not been reversed. A more comprehensive aid program and increased trade are on the American agenda for Japan in 1955.

Markets Ahead—Another challenge and opportunity which faces

Europe's Metalworking Finishes Strong in '54

WORLD STEEL production will be about 245 million net tons in 1954—down 14 million tons from '53. Significantly, U.S. output will be off 23 million tons while the production of practically every other steelmaking country in the world will be at or near record levels.

Thus, steel output, as an economic indicator, signals a milestone in 1954: Our European allies no longer need to be spoon fed with American aid; they're strong in steel output and well able to compete in world metalworking markets.

This winds up STEEL's series of foreign outlook stories.

free-world nations in 1955 is how to meet the driving demands of underdeveloped nations to industrialize and raise their standards of living.

The major problem in improving trade with underdeveloped countries is that of financing. U. S. exporters are hampered by being able to offer only short-term credit, compared with longer terms offered by government-underwritten foreign traders. But signs appeared in late '54 that there are agencies moving to meet this lack of middle and long-term financing. Secretary of the Treasury George Humphrey told the Inter-American Economic Conference in Quitandinha, Brazil, that the Export-Import Bank intends to become more active in this financing field. The administration has also recommended the U. S. government's participation in an international finance corporation proposed by the World Bank.

Europe's Part . . .

WEST EUROPE'S rehabilitation is of especial interest to Americans because they have invested so much money in it; and because Europe, as the most highly developed metalworking area outside the U. S., is a prime competitor of U. S. products.

Europe's industrial recovery has been effective and complete. French production is up 35 per cent over-all from what it was before World War II. West German output is almost double that of 1937. In England, production is about 5 per cent higher in 1954 than in 1953, the previous record year.

Eye Opener—These gains held through the American "adjustment" of 1953-54. That's an eye opener for both Americans and Europeans because the American economy is commonly taken as a bellwether for what the European economies will do.

Measured by gold and dollar holdings, Europe in June, 1954, had $14.2 billion against $10.7 billion in December, 1952. Every Western European country, except Turkey, participated in that gain of $3.5 billion.

Strong and Peaceful—The prime fact about the recent prosperity in Europe was pointed out by the United Nations Economic Commission for Europe: High industrial activity was not due to boom conditions nor had it been carried forward by speculative forces. Stability was the predominant factor.

Offshore procurement was substantial last year, but new ordering was dwindling. In the fiscal year ending June 30, 1954, awards totaling $612,050,000 had been let in Europe—well below the rate of the last two years.

A Look East—In eastern Europe there were indications during 1954 of an attempt to departmentalize the economies of the Russian satellite countries. The industrial role of Poland was confirmed by construction of new furnaces at the Lenin works. Hungary and Rumania seem to be directed toward agriculture.

In Eastern Germany steel output has increased by about 350,000 tons to over 2,750,000 tons for 1954.

As 1954 came to a close the future of the European Coal & Steel Community was being questioned by some Europeans (see the West German report). But Jean Monnet, retiring president of the High Authority of ECSC, could still say ". . . the institutions of the coal and steel community are, so far, the only European institutions to which the national parliaments of our member countries have consented to transfer part of their sovereignty and which they have vested with power of decision. They have been functioning for the past two years, and the first European market is today a living reality. . . ."

Trade among the member countries of ECSC has increased in 1954; special steels are now within the control of the High Authority. The new year is likely to see some form of agreement between the ECSC and Great Britain. So that, in any case, the ECSC will dominate the European steel market again in 1955.

This summary concludes STEEL's series on the economic presents and futures of the major Western European countries. The series was prepared by STEEL's European staff headed by Vincent Delport. J. A. Norton gathered material for the article on Great Britain. Dr. Herbert Gross prepared the German report. The article for France was done by Leon Jaudoin and Jacques Foulon prepared the Belgian report. The Swedish analysis this year was written by Dr. Erik Ruist.

Black Star

Europe needs less U.S. aid as its industries prosper . . . but Asia needs and will get more help from America

. . . a customer speaks with

CONFIDENCE

in his manufacturing equipment

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Mult-Au-Matics

have earned this confidence in many plants.

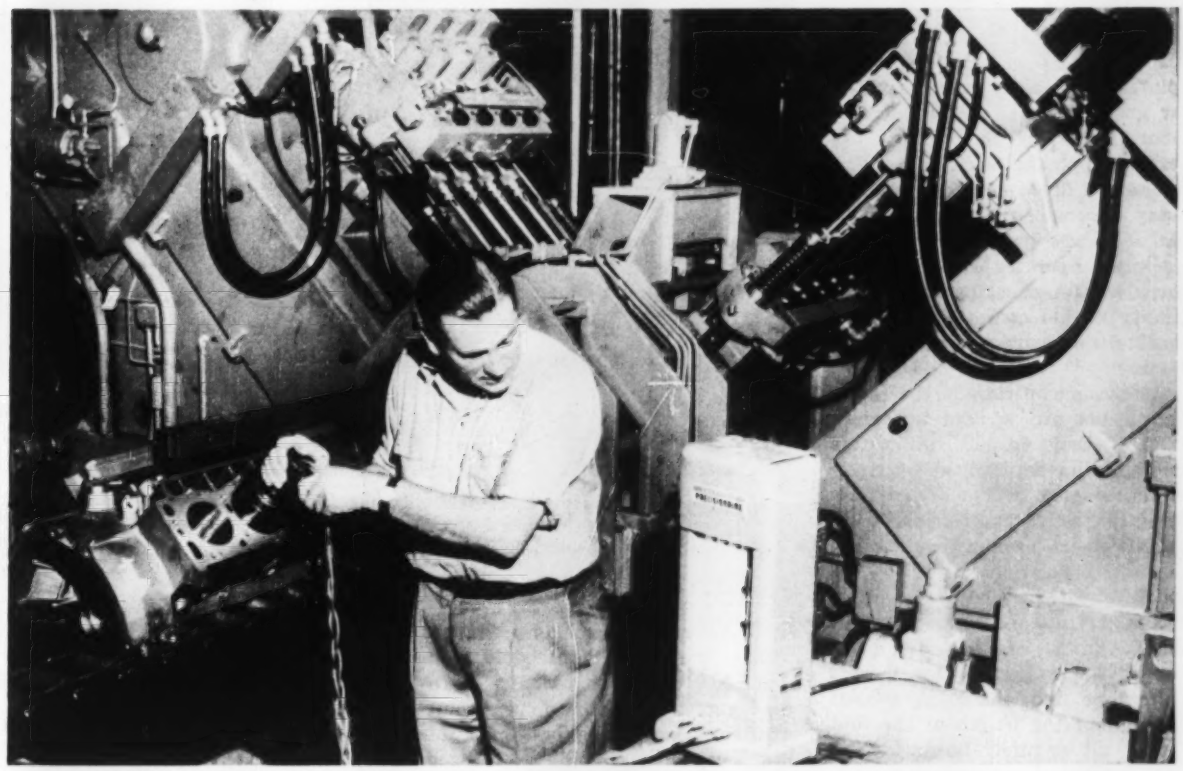
Mult-Au-Matic accuracy and efficient production are key notes from satisfied users.

Where others profit from Mult-Au-Matic installations, you too can benefit. Ask Bullard for surveys on your work.

THE **BULLARD** COMPANY

BRIDGEPORT 2, CONNECTICUT

By FLOYD G. LAWRENCE *Detroit Editor*



With careful testing, no multiplicity of operations, Studebaker-Packard shows . . .

Automation Works for Limited Volume, Too

DETROIT

"MOST EXTENSIVE facilities modernization program ever undertaken by an automobile manufacturer during a single year" is the claim made by Studebaker-Packard for its new plant and equipment.

Translated in terms of impact on the firm's operation, the statement seems pretty safe. Other firms may have spent more money, but since the last holiday season, Packard has tooled a completely new automated V-8 engine line and a transmission line at the Utica plant, plus a final assembly plant.

Less Space—Keynoting the efficiency of the new plants is the fact that present productive facilities occupy some 2 million less square feet of floor space, while production capacity has been maintained at previous levels. Already reported is the new Conner facility (see STEEL, Oct. 18, page 63), but perhaps even more dramatic is the new engine plant.

The argument has been raised by some that automation is a field in which the Independents are handicapped because of their limited volume, but the Packard engine line looks good by anybody's automation standards. Designed for an output of 100,000 engines annually on single-shift operation, the line is perhaps unique in having only one tool for each manufacturing step. Other engine lines in the industry duplicate machines to balance capacity.

No Multiplicity — Translated, that means basic cycle time is set up on the longest single operation in the line. Where others might have to make two or three passes at the same hole necessitating additional drill-heads, Packard does the job in one pass. The block line, for example, is only 800 feet in length, contrasted with Ford's six-cylinder engine line in Cleveland, which is 1545 feet in length. That enables Packard to achieve comparable operating costs to other plants by avoiding multiple equipment and multiple staffs as well, believes Ray P. Powers, operations vice president.

On that basis, the Packard facility is unique for a parsimony of equipment but certainly not for stinting on the most modern equipment available. You'll find the latest from Micromatic and Greenlee, Gisholt automatic balancers and even a rotary test stand similar to the one at the new Pontiac engine works. Camshaft and crankshaft ways are bored in line and the bearings pressed in automatic-

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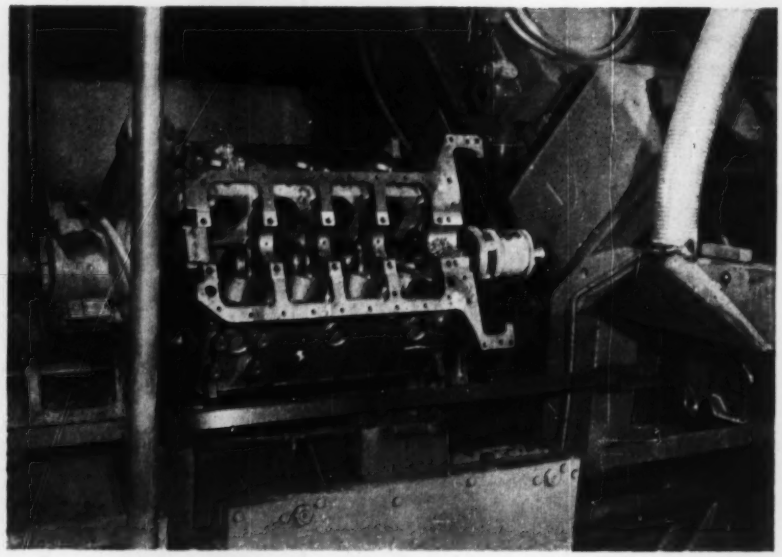
ally. Sealant is applied and welsh plugs inserted in the blocks automatically.

Inspection — Ranking with the best from an automation standpoint, the Packard line takes little for granted in the quality department. Over 200 inspections are performed on the block alone, with tolerances down to 0.0005 in. on many dimensions. Air gages peek out of nearly every interstice, and the plant operates on a policy of every worker checking closely the quality of his own work in addition to the usual inspection stations.

After some operations, the blocks and heads are ejected automatically if they do not fall within tolerance as determined by automatic gaging. Blocks are rotated to dump chips between operations, where packing could cause tool breakage. Before entering the finish operations, they are washed thoroughly in one station on the line. And in the best tradition, the blocks progress automatically from one station to the next throughout the length of the line.

Not all engines, however, will go into Packards. Another firm will use them in two of its lines of cars to be introduced in 1955, and negotiations are under way with several truck makers. On two shifts, the Utica plant could turn out 200,000 engines annually. With the gutty, precision power plant the firm is turning out, most of that capacity should be utilized one of these days.



Fixture at left and center lifts the block from conveyor, turns it one complete rotation to dump chips and then replaces the block in proper position for the next operation

Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	676,233	782,491
May	621,349	684,843
June	623,732	713,778
July	543,534	756,592
August	523,799	640,186
September	364,441	605,228
October	312,078	651,153
November	616,509†	458,567
December		529,588
Total		7,816,592

Week Ended	1954	1953
Nov. 20	160,097	108,729
Nov. 27	134,858	74,290
Dec. 4	171,189	123,148
Dec. 11	176,075	113,145
Dec. 18	180,087	132,093
Dec. 25	149,000*	92,247

Source: Ward's Automotive Reports. †Preliminary. *Estimated by STEEL.

Nash-Healey—A Goin' Machine

One of the most cosmopolitan cars plying the American road today is the Nash-Healey. With a chassis built by Donald Healey in England, a body by Pinin Farina in Italy and an engine and drive train built by Nash here in the United States these rigs have a bit of trouble knowing what to call home.

But the Nash-Healey is more than at home on the road. An opportunity to drive the late George Mason's car reveals nice performance, a beautifully flexible transmission and fine handling. With the Nash LeMans engine and the Healey suspension, the car probably will get you further in a given time more safely than any but a few of the makes registered around the country today.

Comparison with the Ford Thunderbird is unavoidable. While the Thunderbird does 0-60 mph in about 11 seconds compared with the Healey's 12 or 13 seconds, the Healey feels a bit more at home in the corners and at speed. And if you delight in your facility with a gearbox as the English call their transmissions, the excellently located short-throw floor shift lever of the Healey will leave you with a nice feeling of intimate mastery of the machine. Coupled with an overdrive which may be kicked in or out by an electric actuator on the horn button position of the steering wheel, the car offers five-speed flexibility adequate to any occasion.

Biggest difference in the two cars, however, is immediately apparent in the price tags. A little modification on a Thunderbird would still leave plenty of gap to the almost $6000 cost of the Nash-Healey, a custom-built car. Incidentally, the custom feature is one disadvantage of the Healey. With each body custom built by Mr. Farina who has concepts rather than blueprints, every body part is hand fitted to luxury standards. The luxury multiplies rapidly if you happen to cream a fender since a new one will have to be hand-formed and hand-fitted, hardly an economical operation.

But for the man who wants a car that's different, the Nash-Healey (only about 500 have been produced so far) should fill the bill nicely.

A PINCH OF LEAD FOR FAST, CLEAN CUTTING

Lead added to Aristoloy Steels acts as a lubricant and reduces friction between tool face and chip. It also produces a better chip formation, allowing higher machining speeds to be employed. Many users report improved machinability ratings, up to 100 for leaded steels as compared to 60 or 70 for the same material unleaded.

Better finish and longer tool life are additional benefits. Heat treating and mechanical characteristics remain unchanged.

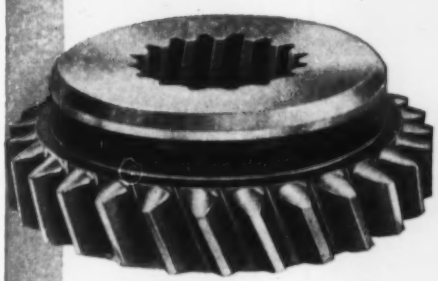
Call your local representative or write today regarding application of leaded Aristoloy to your product.

ARISTOLOY STEELS

COPPERWELD STEEL COMPANY
(STEEL DIVISION) WARREN, OHIO

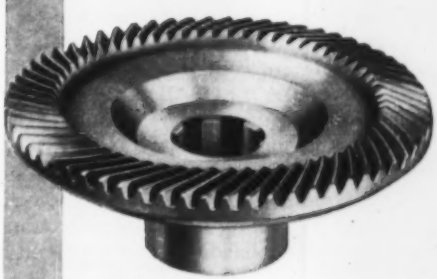
BALL STUD

Use of 8640 Leaded improved automatic screw machine production nearly 40% for a large job shop. Production per machine hour increased from 108 to 150 pieces.



SPUR GEAR

A machine tool manufacturer cut machining time ⅓ by switching to Aristoloy 4140 Leaded. And finish was greatly improved—from FAIR to EXCELLENT.



SPIRAL GEAR

Machinability was increased 25% when Aristoloy 4140 Leaded was substituted for non-leaded AISI equivalent. Biggest saving from a cost standpoint was a 75% improvement in tool life.

SEND FOR FREE BOOKLET ON LEAD-TREATED ALLOYS

You can order 52100 tubing right now...

we'll ship tomorrow

WHEN you need 52100 steel tubing in a hurry, get us on the phone. We'll ship the next day. We stock 101 different sizes of Timken® 52100 steel tubing —from 1″ to 10½″ O.D. All of them are available for less-than-mill-quantity orders.

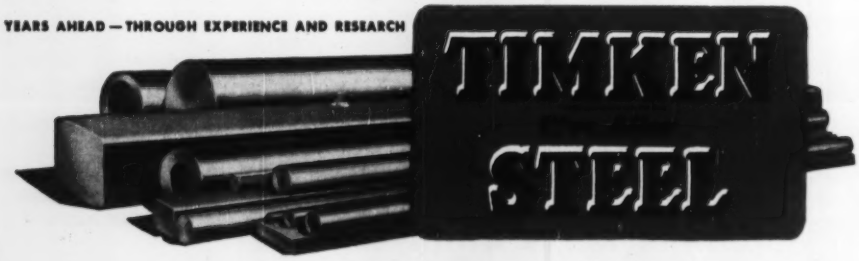
Timken 52100 steel can be used for most hollow parts jobs and many manufacturers have substituted it for more expensive steels. A high-carbon chrome steel, it's through-hardening in moderate sections. It can be heat-treated to file hardness and tempered back to any desired point.

Here are some of the jobs 52100 is now being used for: aircraft parts, ball bearing races, pump parts and plungers, collets, bushings, spindles, grinding machine parts and precision instrument parts.

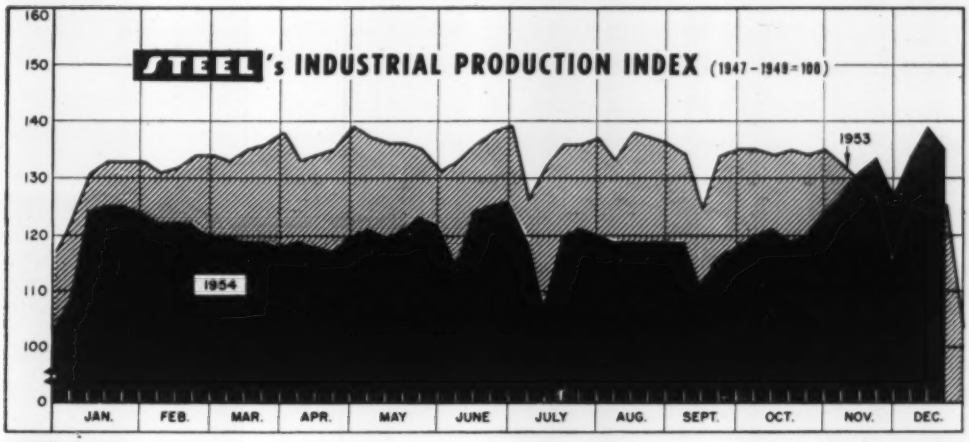
The Timken Company is America's pioneer producer of 52100 tubing. We have an unequalled backlog of experience and as a result we can give you uniform quality from tube to tube—order to order. Every step of production is rigidly checked.

For immediate delivery of your less-than-mill-quantity orders, write or phone The Timken Roller Bearing Company, Steel & Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



LATEST WEEK* 135
PREVIOUS WEEK 139
MONTH AGO 134
YEAR AGO 125

*Week ended Dec. 18.

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%.

Industrial Production Index Ties 1953 Peaks

STEEL's rising industrial production index zoomed to a revised 139 in the week ended December 11. On only two other occasions (during free-wheeling 1953) has it reached that point.

All index components contributed to the peak. Steel production was at a 1954 high of 81.5 per cent of capacity. Auto output was strong, with over 170,000 cars and trucks turned out in U.S. plants.

High Voltage — Electric power set a record of its own, hitting 9846 million kilowatt-hours. All sections of the country participated in that increase. Most notable was the Southeast with a gain of 26.2 per cent over a year ago. The important Central Industrial region continued to show the effect of reviving business with a rise of 10.5 per cent over a year ago. Cold weather also contributed to high power usage.

Freight car loadings showed surprising strength, surpassing a corresponding week of 1953 for the first time this year. High coal loadings made up for drops in most other classes of freight.

Holiday Spirit — Preliminary figures for the week ended Dec. 18 place the index at 135. That will be the last week of 1954 not affected by holiday production cutbacks. Even so, at first glance it looks like the holiday dip will be smaller than usual this year.

Steel producers are well booked up through first quarter, and for that reason production is likely to shoot through the holiday period at a good clip. The auto industry is hitting its stride in 1955 model production. Some slack-off will be evident, but overtime work will keep over-all weekly production high.

Busy Pencils—New cars seem to be selling better than expected. As a result, at least one major producer is raising its first-quarter sights. Others may follow suit to some extent.

Now programmed for first quarter are 1,983,000 units, says *Ward's*

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,756	1,950	1,440
Electric Power Distributed (million kwhr)	9,504[1]	9,846	8,896
Bitum. Coal Output (daily av.—1000 tons)	1,464	1,417	1,398
Petroleum Production (daily av.—1000 bbl)	6,280[1]	6,341	6,248
Construction Volume (ENR—millions)	$271.8	$258.3	$655.1
Automobile, Truck Output (Ward's—units)	180,087	176,075	132,093
TRADE			
Freight Car Loadings (unit—1000 cars)	612[1]	654	618
Business Failures (Dun & Bradstreet, no.)	216[1]	223	210
Currency in Circulation (millions)[3]	$30,773	$30,697	$30,953
Dept. Store Sales (changes from year ago)[3]	+1%	+1%	−3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,993	$19,244	$19,530
Federal Gross Debt. (billions)	$278.7	$278.8	$274.9
Bond Volume, NYSE (millions)	$40.2	$27.3	$16.3
Stocks Sales, NYSE (thousands of shares)	15,206	18,506	8,014
Loans and Investments (billions)[4]	$85.6	$85.8	$80.4
U. S. Gov't. Obligations Held (billions)[4]	$36.8	$37.1	$32.7
PRICES			
STEEL's Finished Steel Price Index[5]	194.53	194.53	189.74
STEEL's Nonferrous Metal Price Index[6]	216.9	217.3	206.2
All Commodities[7]	109.4	109.4	110.1
Commodities Other Than Farm & Foods[7]	114.7	114.7	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,384,549. 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

A NAGGING WIFE MAY SAVE YOUR LIFE

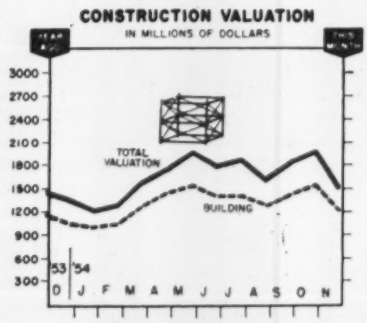
IF YOU ARE OVER 45 and your wife keeps insisting that you should have *two* chest x-rays every year... don't blame her. *Thank* her! Semi-annual chest x-rays are the best "insurance" you can have against death from lung cancer.

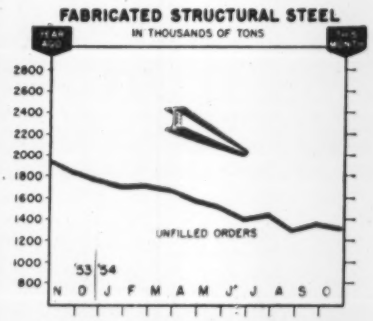
The cold fact is that lung cancer has increased so alarmingly that today you are six times more likely to develop lung cancer than a man of your age 20 years ago. Our doctors know that their chances of saving your life could be as much as ten times greater if they could only detect lung cancer before it "talks"... before you notice any symptom in yourself. That's why we urge you to make semi-annual chest x-rays a habit—for *life*.

To see our new life-saving film "The Warning Shadow" call the American Cancer Society office nearest you or simply write to "Cancer" in care of your local Post Office.

American Cancer Society

THE BUSINESS TREND





37 States

	Total		Building	
	1954	1953	1954	1953
Jan.	1,151.9	1,075.9	935.6	876.0
Feb.	1,221.3	1,021.3	977.5	792.9
Mar.	1,527.5	1,374.5	1,199.8	1,054.4
Apr.	1,691.9	1,741.5	1,401.6	1,354.2
May	1,925.3	1,606.1	1,497.6	1,219.8
June	1,733.3	1,115.5	1,376.7	922.3
July	1,836.9	1,793.3	1,386.9	1,417.8
Aug.	1,572.9	1,414.4	1,243.3	1,053.4
Sept.	1,816.2	1,741.7	1,424.2	1,290.7
Oct.	1,965.3	1,892.4	1,522.8	1,392.7
Nov.	1,498.9	1,394.1	1,199.8	1,096.0
Dec.	.....	1,279.8	.....	973.8
Total	.....	17,423.5	.....	13,455.0

F. W. Dodge Corp.

	Shipments		Backlogs	
	1954	1953	1954	1953
Jan.	245.6	241.4	1,686	2,180
Feb.	253.1	251.1	1,697	2,128
Mar.	285.4	266.3	1,645	2,155
Apr.	293.5	263.2	1,566	2,168
May	253.9	263.8	1,490	2,179
June	290.3	274.6	1,391	2,153
July	265.2	230.3	1,429	2,134
Aug.	272.5	251.1	1,270	2,122
Sept.	265.4	255.6	1,329	2,041
Oct.	254.5	295.5	1,294	1,927
Nov.	....	257.8	....	1,804
Dec.	....	266.9	....	1,741
Total	....	3,117.6		

American Institute of Steel Construction

Charts copyright 1954 STEEL.

Automotive Reports. That's an annual rate of 7,932,000 units, but such production is hardly to be expected for the entire year.

But for first quarter at least the auto industry's plans reinforce the steel producers' optimism for 1955. And, auto production is due for another small spurt when the remaining Independents get their lines rolling. Packard and Willys are already turning out a few cars. Others are due this week or soon after Jan. 1.

Good News at GM, Chrysler . . .

At least two members of the Big Three are reasonably happy with the way their 1955s have been received. General Motors Corp. passenger car sales set new all-time records for the first 10 days of December, more than double year-ago sales. Orders received by dealers exceeded production by a substantial margin.

Chrysler is hitting its 1955 goal of 20 per cent of total passenger car production. Around 200,000 new models have been built, and the factory still has on order about 250,000, meaning orders for Chrysler products are close to the half-million mark. Employment is 160,000 against 133,000 a year ago.

Electronics: Better Yet in 1955...

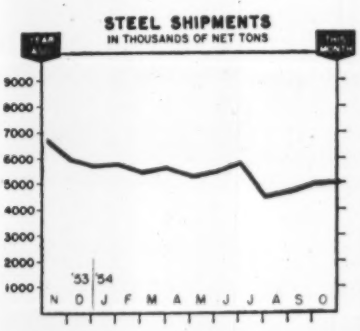
Another booming industry has its sights set on an even bigger year in 1955. For the electronics industry, next year "has every promise of being equally good (as an excellent 1954) in production and sales and perhaps even better in profits," says James D. Secrest, executive vice president of Radio-Electronics-Television Manufacturers Association.

Another bright spot for electronics people is military buying, currently about $2.5 billion a year. And "electronics will be one of the last industries to feel the knife in any curtailment of armaments," says Mr. Secrest.

Turnabout's Fair Play . . .

The high consumption of electricity brings sales right back to metalworking. Buying of turbines and other large rotating equipment by utilities in the last three months just about equaled the total for the first eight months of the year, says General Electric Corp.'s Henry V. Erban.

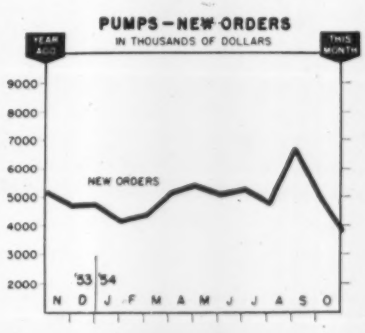
Another widely used measure of business activity is moving upward. The Federal Reserve Board's Industrial Production Index hit an unadjusted figure of 130 (1947-



Net Tons

	1954	1953	1952
Jan.	5,727,600	7,067,636	6,589,193
Feb.	5,364,978	6,533,227	6,358,293
Mar.	5,583,690	7,436,919	6,890,391
Apr.	5,287,972	7,162,460	5,922,173
May	5,423,168	7,209,396	5,947,450
June	5,887,488	6,950,059	1,250,243
July	4,490,179	6,582,513	1,413,672
Aug.	4,681,242	6,498,605	6,312,118
Sept.	5,004,222	6,400,757	6,542,147
Oct.	5,035,364	6,726,850	7,155,611
Nov.	.....	5,903,980	6,647,725
Dec.	.....	5,684,920	7,105,382

American Iron & Steel Institute.



In Thousands of Dollars

	1954	1953	1952
Jan.	4,057	5,752	5,517
Feb.	4,272	6,521	6,020
Mar.	5,093	8,255	5,925
Apr.	5,319	7,758	6,354
May	5,007	4,629	6,140
June	5,176	5,690	7,957
July	4,733	5,533	6,299
Aug.	6,706	4,886	5,921
Sept.	5,050	4,845	5,258
Oct.	3,828	5,097	5,534
Nov.	....	4,634	4,130
Dec.	....	4,645	6,575
Total	....	68,245	71,630

Hydraulic Institute.

1949 = 100) for November. That 130 is also the average of STEEL's weekly index for the month and indicates that rising production reported by the FRB in October was no flash in the pan.

Durable goods manufacturers continued the uptrend which started a couple of months ago. Consumer durables showed outstanding strength, with autos the star performer. Other segments of metalworking showing gains in the latest FRB figures are primary ferrous and nonferrous metals, castings and forgings, stampings, fabricated metal products and electrical apparatus and parts.

Farm machinery was down a little; machine tools and aircraft also showed small dips. Outlook is for a rise in first quarter.

Building Gains, Loses . . .

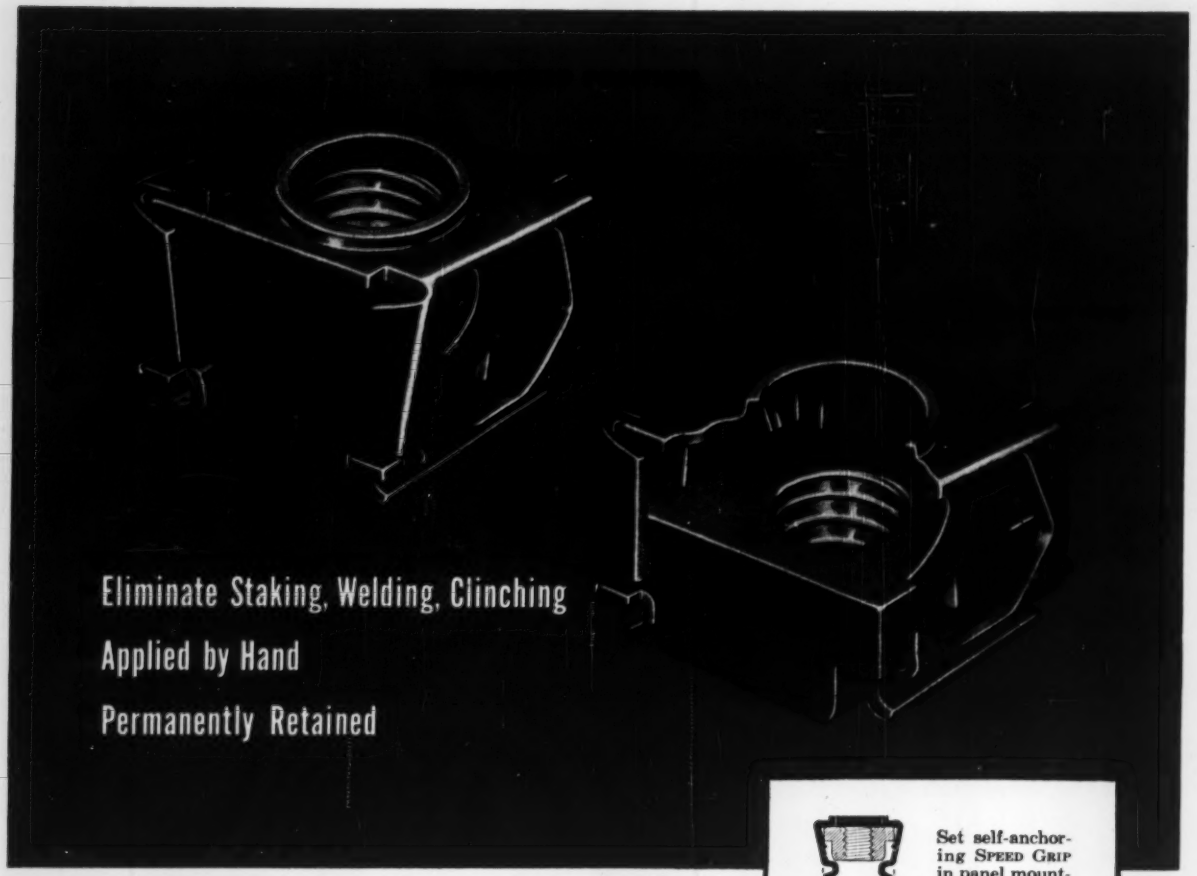
Construction is a field that, to say the least, has been doing all right for itself. The normal seasonal decline is on, but, comparatively, things are going quite well. Heavy construction contract awards for the latest week reported by *Engineering News-Record* rose to $272 million from the preceding week's $258 million. Even so, 1954 awards to date fell to 5 per cent under the 50-week total of 1953.

The reason for the falling behind was that two large industrial building contracts were let in the like 1953 week. The latest week's volume was helped out by a rise in state and municipal awards and some gain in federal building contracts.

Along the same line, the Labor department sets nonfarm housing starts at 103,000 in November, a new record for the month and unusually high for that time of year. It's 26 per cent over the November, 1953, figure and only 3 per cent under October's; usually the drop between the two months is 10 to 15 per cent.

Trends Fore and Aft . . .

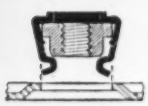
Cash dividend payments by corporations issuing public reports were $256.5 million in November, $24 million above that month of 1953, says the Commerce department. For 11 months of 1954, dividends are about $500 million higher than the like period of last year . . . "Incoming sales are holding rather steady, and it appears that the low month in orders was reached last May," says J. W. Corey, president, Reliance Electric & Engineering Co., Cleveland.



New, Self-Anchoring SPEED GRIP®
cuts assembly costs in half!

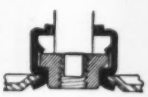
Whatever your present method of attaching square nuts to panels, new self-anchoring SPEED GRIPS can do the job faster, easier, better. This unique fastener has spring steel "mechanical hands" that permanently lock the nut in bolt-receiving position. It cannot be dislodged even with rough handling. Applied after painting or porcelainizing, there is no clogging, retapping or masking of threads to bother about. *And* it is ideal for blind location attachments.

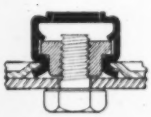
Total up the savings in application time—in expensive assembly equipment—in handling time—in assembly steps—and you'll switch to self-anchoring SPEED GRIPS—the newest addition to the complete Tinnerman line of Nut Retainers.



Set self-anchoring SPEED GRIP in panel mounting hole.

Simple tool presses nut into locked position.





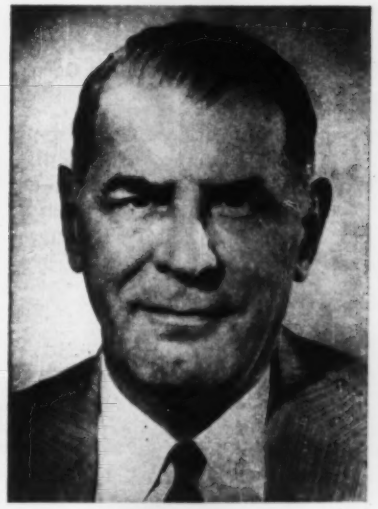
Heavy duty nut in locked position — permanently retained — can't rotate, rattle or be dislodged.

Write today for free copy of new detailed SPEED GRIP Bulletin, No. 335. Tinnerman Products, Inc., Dept. 12, Box 6688, Cleveland 1, Ohio. *In Canada:* Dominion Fasteners Ltd., Hamilton, Ontario. *In Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales. *In France:* Aerocessoires Simmonds, S.A., 7 rue Henri Barbusse, Levallois (Seine).

TINNERMAN Speed Nuts®

MORE THAN 8000 SHAPES AND SIZES

G. A. JOHNSTON
. . . Solar's San Diego plant p. a.



RANDOLPH J. ROSHIRT
. . . Aluminum Industries executive v. p.

RAY P. POWERS
. . . Studebaker-Packard v. p.-operations

G. A. Johnston was named purchasing agent of **Solar Aircraft Co.'s** San Diego, Calif., plant. He succeeds **R. W. Brick,** who leaves Solar Dec. 31 to become executive secretary-treasurer of the Purchasing Agents' Association of Los Angeles. Mr. Johnston has been assistant purchasing agent of the San Diego plant.

George N. Popham was elected president and general manager, **Gorham Tool Co.,** Detroit, to succeed **Don T. Flater,** resigned. Mr. Popham was vice president and sales manager.

Stuart A. Loveridge was made president of **Autoyre Co.,** Oakville, Conn., a subsidiary of Ekco Products Co.

Dr. Robert H. Krieble was appointed manager, chemical development department, of **General Electric Co.'s** chemical and metallurgical division, Pittsfield, Mass. He succeeds **Dr. Alphonse Pechukas,** who was made consultant-materials and processes, engineering services division.

Jacob Katz was elected manager, **Schock, Gusmer Division,** Pfaulder Co., Rochester, N. Y., which was acquired by Pfaulder Sept. 14. Mr. Katz formerly was vice president of Schock, Gusmer & Co.

Randolph J. Roshirt was elected executive vice president of **Aluminum Industries Inc.,** Cincinnati, and **R. Wain Bowman** was made vice president of the Permite paint division. Before joining the company in 1953, Mr. Roshirt was executive vice president of Bohn Aluminum & Brass Corp. He has served Aluminum Industries as vice president since May, last year.

Hjalmar A. Anderson was appointed chief project engineer, **Lindberg Industrial Corp.,** Chicago. He formerly was assistant chief engineer, industrial furnace division, Sunbeam Corp.

John W. Dean Jr., formerly manager, Marion Industries Division, Motor Products Corp., joined **BMC Mfg. Corp.,** Binghamton, N. Y., to fill the newly created position of vice president-general manager.

Daniel J. Mooney Jr. was made New York district sales manager, **Edgewater Steel Co.**

Norman L. Danforth was named manager of **Allis-Chalmers Mfg. Co.'s** Toledo, O., district, general machinery division. He succeeds the late **W. W. Moore.**

National Automotive Fibres Inc., Detroit, elected **John G. Bannister** to the newly created post of first vice president and **M. K. Leahy,** to vice president-manufacturing.

Ray P. Powers was elected vice president - operations for **Studebaker-Packard Corp.,** Detroit. Formerly vice president of operations for Packard, he will direct and coordinate manufacturing, purchasing and industrial relations for both automotive and defense divisions.

Irvin C. Kinney advances from assistant manager, Fairfield, Ala., district sales office, to advertising manager for the **Tennessee Coal & Iron Division,** U. S. Steel Corp., at Birmingham.

Christian F. Beukema was elected president, **Michigan Limestone Division,** U. S. Steel Corp., Pittsburgh. Formerly vice president, he succeeds **Hugh S. Lewis,** who continues with the corporation in a consulting capacity. Mr. Beukema was appointed vice president of the limestone division in March.

Republic Steel Corp., Cleveland, appointed **Robert R. Newell** assistant manager, bar sales division. He succeeds **Henry P. Rankin Jr.,** recently made manager. **W. H. Gibbons Jr.** was made assistant manager of the Houston district sales office for the corporation to succeed **C. W. Kennedy,** transferred to Tulsa, Okla., as district sales manager.

Lawrence Wilkinson was elected group vice president, and **Charles**

J. T. WELCH
. . . Sheffield machine tool div. mgr.

JOSEPH F. JANECKE
. . . new post with Chicago Vitreous

R. S. BRIGHT
. . . named to Dodge executive staff

B. Stauffacher, vice president-finance, at **Continental Can Co.**, New York.

J. T. Welch is now manager, machine tool division, **Sheffield Corp.**, Dayton, O.

John F. Chipman was named general manager, Boston Works, **Allis-Chalmers Mfg. Co.** He succeeds **L. W. Long**, who is now general manager of the firm's Terre Haute, Ind., plant.

Herbert M. Wilson, executive vice president, **Shenango Furnace Co.**, Pittsburgh, and chief operating officer of all W. P. Snyder & Co.'s interests, has retired.

Patrick E. Lannan was elected vice president and project manager of electronic electrical research and development at **Designers for Industry Inc.**, Cleveland.

Joseph F. Janecke was made market development engineer at **Chicago Vitreous Corp.**, Cicero, Ill. He formerly was field service and market development manager for Ferro Corp.

American Electro Metal Corp., Yonkers, N. Y., elected **Col. Richard L. Hopkins** vice president. He joined the firm earlier this year. He will direct its business administration and supervise special metals production.

Seth Miller was appointed manager of operations for **Deepfreeze Appliance Division**, Motor Products Corp., Chicago. He will direct production, personnel and purchasing. Mr. Miller succeeds **Pat Leone**, resigned.

R. S. Bright was appointed to the executive staff of **Chrysler Corp.'s Dodge Division**, Detroit. In addition to undertaking executive assignments for the president and vice president-general manager, Mr. Bright continues direction of the three Dodge plants in Indiana; the PowerFlite transmission plant in Indianapolis; the transmission plant in Kokomo, Ind.; and the machined parts and forge plant at New Castle, Ind.

Boyd M. Johnson was made general manager of **Carborundum Co.'s** refractories division in Perth Amboy, N. J., to succeed **Clarence E. Hawke.** Mr. Hawke, as a vice president of the company and special consultant to the president, will give particular attention to development and marketing of Fiberfrax ceramic fiber, a new company product adapted to high temperature application such as jet blankets.

Chester R. Austin joined **Kaiser Engineers Division**, Henry J. Kaiser Co., Oakland, Calif., to head the oxygen steel division.

Gerald W. Yeager was elected treasurer and a director of **Louden Machinery Co.**, Detroit, to succeed **A. E. Labagh**, retired.

American Brake Shoe Co., New York, elected **Victor L. Persbacker** comptroller, **Rush M. Forquer Jr.** and **Wendell P. Kesselr** assistant comptrollers. Mr. Persbacker succeeds **Edward C. Hof**, retired.

Jordan P. Freemantle was made sales engineer for the **Butterfield Division**, Union Twist Drill Co., Derby Line, Vt. He will serve the New York and northern New Jersey area, with headquarters in New York.

Dr. Howard Baller, since 1949 assistant manager, electronics department, W. L. Maxson Corp., and also head of that firm's research section, joined the staff of **General Mills Inc.**, Minneapolis. He will serve as manager of electronics in the engineering research and development department.

Howard D. Tindall was made manager, transformer division, **Federal Pacific Electric Co.**, Newark, N. J. His duties include management of Gardner Electric Mfg. Co., San Francisco, a subsidiary. Mr. Tindall formerly served Moloney Electric Co. as a vice president and assistant chief engineer.

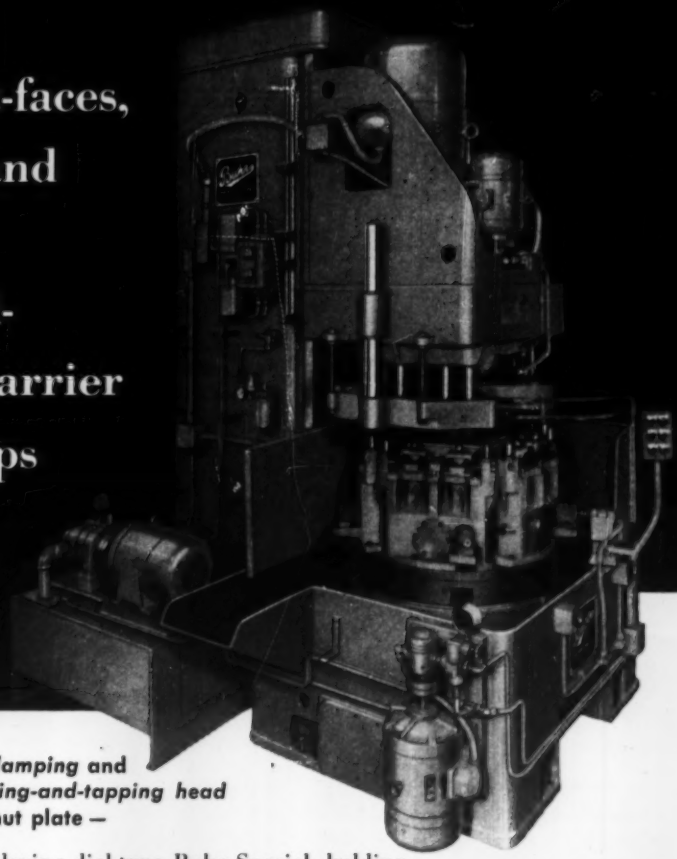
Duff-Norton Mfg. Co., Pittsburgh, elected **Evans Rose** a director and secretary to replace **Frank O. Graham**, retired.

Robert G. Weiske joined **Trane Co.'s** new research and testing laboratories, La Crosse, Wis., as an engineer.

Wayne E. Grimm was made director of management development and **Albert R. Walcot**, senior staff co-ordinator in the management

Buhr SPECIAL...

Drills, spot-faces, chamfers and taps 670 differential-carrier bearing caps an hour!



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Operations include drilling and spot-facing two bolt holes, and drilling, chamfering and tapping the center hole of each bearing cap.

Tapping spindles are of the individual lead-screw type with precision-ground and hard chrome-plated threads — a Standard Buhr Feature.

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MULTIPLE-SPINDLE HIGH PRODUCTION MACHINERY

Solidly Engineered . . . Precision Built . . . for World's Leading Manufacturers

development department of **Chrysler Corp.**

William A. Tebbel, for 12 years vice president and controller, Gibson Refrigerator Co., was elected treasurer of **Fruehauf Trailer Co.,** Detroit.

Philip La Follette, former governor of Wisconsin, was named president of **Hazeltine Electronics Corp.,** Little Neck, Long Island, N. Y. He joined the parent company, Hazeltine Corp., in 1946 as its associate general counsel and was made a director in 1947.

F. W. McIntyre Sr., chairman of the board and former president, has retired from **Reed-Prentice Corp.,** Worcester, Mass. He is now a consultant to the company.

At **U. S. Steel Corp.'s** Gary, Ind., sheet and tin mill, **Ralph P. Deputy** was made assistant to the general superintendent. **Earl D. Spangler** was made division superintendent-sheet mill; and **Rolland E. Peterson,** division superintendent-hot rolling. **Charles S. Sanford** was made superintendent of the 80-in. hot strip mill; **Max E. Bills,** superintendent-continuous pickling; and **Roland G. Ebert,** superintendent of slab conditioning.

Dr. William Firestone was recently appointed to the newly created position of assistant chief engineer, research department, in the electronics division of **Motorola Inc.,** Chicago.

Wyeth Allen resigns as president of **Globe-Union Inc.,** Milwaukee, to re-enter the management consultant field.

WILLIAM J. FADDEN JR.
. . . chief mechanical eng. at Kuljian

William J. Fadden Jr. was appointed chief mechanical engineer of **Kuljian Corp.,** Philadelphia.

Fred A. DeMaestri, former technical supervisor of Ehret Magnesia Mfg. Corp., joined **Michigan Chemical Corp.,** St. Louis, Mich., as vice president in charge of operations.

Col. J. G. Vincent has retired as an active member of the management group of **Studebaker-Packard Corp.,** Detroit. For 33 years he served as Packard engineering vice president and as a director for the last nine years. Colonel Vincent continues as an engineering consultant on special assignments.

Gar Wood Industries Inc., Wayne, Mich., appointed **Leo M. Brown** assistant to the director of sales and advertising. He formerly was sales manager of the firm's St. Paul Hydraulic Hoist Division.

Harlan Stoller was named director of government, export and road machinery sales of **Heil Co.,** Milwaukee. **Paul Miller,** sales manager of the former road machinery division, was made sales manager of the newly consolidated department.

George E. Whitlock was elected chairman of the board of **Mullins Mfg. Corp.,** Salem, O., succeeding **Henry A. Roemer,** chairman of Sharon Steel Corp. Mr. Roemer has been chairman since the merger of Mullins and Youngstown Pressed Steel Co. in 1937.

C. Allen Davis was made assistant division superintendent, Carrie Blast Furnace Division, **U. S. Steel Corp.'s** Homestead, Pa., district works. He succeeds **W. H. Ashton,** now superintendent of American Steel & Wire Division's central furnaces and docks.

William J. Ransom was named general manager of **Reibold Industries Inc.,** Downey, Calif.

Cummins Engine Co. Inc. appointed **M. W. Brooks** regional manager, midwest district-central region, with headquarters in St. Louis. **H. A. Strohman,** assistant regional manager, eastern region, transfers from New York to the new middle Atlantic office at Harrisburg, Pa.

Eugene P. Reed, assistant manager, was promoted to manager-raw materials for **Tennessee Coal & Iron Division,** Birmingham, U. S. Steel Corp. He succeeds **Ralph E. Kirk,** retired.

OBITUARIES . . .

David J. Joseph, 68, founder and chairman of the board of **David J. Joseph Co.,** Cincinnati, died Dec. 13.

John T. Harwood, 57, assistant purchasing agent, **Link-Belt Co.,** Chicago, died Dec. 6.

Peter E. Wiberg, 96, founder and president, **Art Wire & Stamping Co.,** Newark, N. J., died Dec. 13.

Thomas E. Akers, 66, chairman of the board and former president of **Dominion Brake Shoe Co. Ltd.,** Niagara Falls, Ont., died Dec. 5.

Clyde H. Bailey, 53, advertising manager for STEEL, Penton Publishing Co., Cleveland, died Dec. 17. He had been with the publication since 1922.

Horace B. Pearson, who retired two years ago as chairman of the executive committee and a director of **National Cylinder Gas Co.,** Chicago, died Dec. 8.

Charles H. Severin, 77, former production manager, **Kent-Owens Machine Co.,** Toledo, O., died Dec. 10.

Joseph H. Mayne, 62, vice president, **France Mfg. Co.,** Cleveland, died Dec. 15.

Harry J. Farrington, 79, president and chairman of the board of **Farrington Mfg. Co.,** Boston, died Dec. 13.

Charles L. Crosby, 61, manager of the Richmond, Va., district office of **Allis-Chalmers Mfg. Co.'s** general machinery division, died Dec. 8.

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Many companies in the chemical industry and others engaged in processing operations have asked themselves that question—and then switched to Claymont Stainless-Clad Plates in place of costly solid stainless steel.

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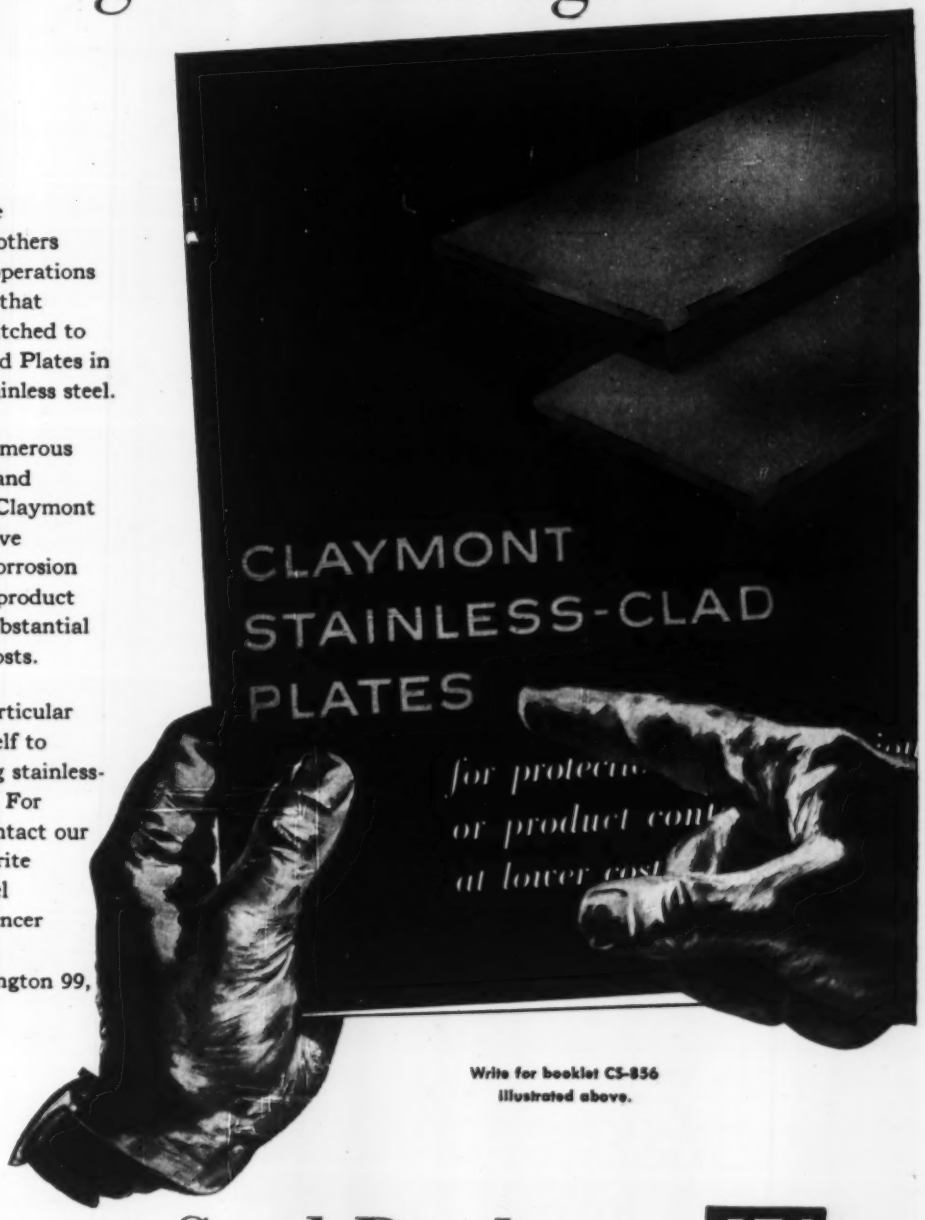
It may be that your particular processing job lends itself to the use of money-saving stainless-clad. Why not find out. For detailed information contact our nearest sales office or write direct to Claymont Steel Products, Wickwire Spencer Steel Division of CF&I, 813 West Street, Wilmington 99, Delaware.



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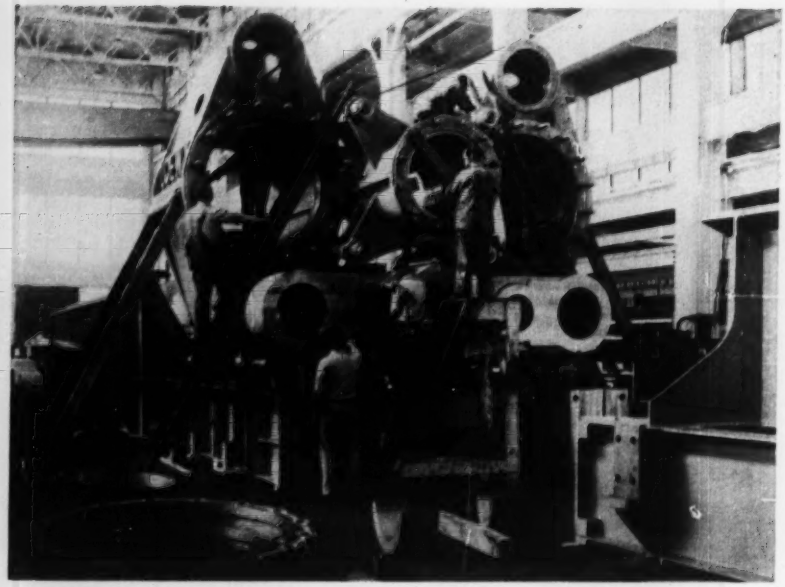


Air Force heavy press program progresses as . . .

Harvey Aluminum Installs Big Units

GIANT extrusion presses are being installed in the heavy press building under construction at the Torrance, Calif., plant of Harvey Machine Co. Inc.'s Aluminum Division.

A joint participation project under the Air Force heavy press program, it is scheduled for completion during the first quarter, with production scheduled for mid-1955.

New Equipment—The facility is a major phase of Harvey's over-all expansion program and will adjoin the company's existing extrusion mill. In addition to a battery of extrusion presses, the new structure will house equipment for heat-treating, aging, annealing (accommodating extrusions 80 ft long), a 1500 and a 750-ton hydraulic stretch-straightener and auxiliary finishing.

Heavy extrusion presses were designed primarily to produce large "one-piece" airframe members. With a 12,000-ton hydraulic press, Harvey will be able to produce aluminum alloys in shapes up to 80 ft long and 25.5 in. wide. By utilizing special extruding techniques, the southern California firm will be able to produce panel-type shapes in single sections as wide as 60 in.

The producibility of heavy press aluminum extrusions with greater cross-section, weight and length dimensions will allow industry to reduce fabricating and machining time and effect substantial manufacturing economies.

Shop erection of an 8000-ton extrusion press by Loewy Construction Co. Inc., New York, is shown above. In addition to the one being supplied Harvey Aluminum, two such presses also are being supplied by Loewy-Hydropress to Kaiser Aluminum as part of the Air Force program.

Kennametal Establishes Branch

The Indianapolis office of Kennametal Inc.'s Cincinnati district is now known as the Indianapolis branch. Frank Hull is the branch manager.

P. K. Industries Buys Rights

P. K. Industries Inc., North Arlington, N. J., acquired a nonexclusive contract with Paul Valve Corp. for the manufacture of that company's Venturiball valves. A merger of operations between several manufacturing and engineering companies under the P-K name makes available greatly expanded valve-making capacity. Facilities include an investment casting foundry and a mechanized department for hard facing critical wear points of valves.

Barnes Drill Opens Branch

Barnes Drill Co., Rockford, Ill., opens a sales office Jan. 1 at 3419 S. Telegraph Rd., Dearborn, Mich., to serve Detroit and eastern Michigan territories. The firm makes honing machines, tools and abrasives, special unit type and transfer production machines, standard drilling machines and coolant cleaning equipment. The office is managed by C. O. Holland.

Lone Star Completes Project

Lone Star Steel Co., Dallas, has completed its $90-million expansion program. E. B. Germany, president, says the rolling mill department has been setting new production records consistently.

Machine Shop Expanding

Monumental Machine Co.—general machine shop work—is building a 14,000-sq-ft plant at 210 Janney St., Baltimore. F. Lester Sims is president.

Valenite Metals Corp. Formed

Valenite Metals Corp. has been organized to manufacture cemented tungsten carbide tools and blanks. Pilot quantities have been produced in its plant at 31100 Stephenson Highway, Royal Oak, Mich. As each grade proves out in test, stocks will be accumulated. The corporation is headed by Eletor Kotwick, formerly vice president and secretary, Modern Corp., Detroit.

American-Marietta Diversifies

American-Marietta Co., Chicago, diversified further in the construction industry by acquiring control of Standard Lime & Stone Co., Baltimore, producer of Portland cement, crushed limestone used by the steel industry and chemical lime. The transaction involved more than $10 million. An expansion program for Standard will be launched immediately. American-Marietta, a large manufacturer of metal powders, paints, res-

ins, household products and materials for building and highway construction, entered the precast concrete field in 1953.

National Tank Co. Expanding

Plans for increased production of tank heads, U-shaped sections, pressure vessels and similar products at National Tank Co., Tulsa, Okla., include the installation of a 1500-ton hydraulic flanging press. It's being built by Baldwin-Lima-Hamilton Corp., Philadelphia.

Dur-O-Wal Opens Toledo Plant

Dur-O-Wal Products Inc., Cedar Rapids, Iowa, opened a plant in Toledo, O., for the manufacture of its steel reinforcing unit used in masonry construction. C. H. Zimmerman is manager of the plant.

Equipment Firms Plan Merger

Carrier Corp., Syracuse, N. Y., and Affiliated Gas Equipment Inc., Monrovia, Calif., will merge, subject to approval of stockholders. Carrier produces air-conditioning devices while Affiliated makes home furnaces.

Quarter Century Metals Club

A group of pioneer Los Angeles and Orange county, Calif., metalworking executives have formed a Quarter Century Metals Club. Membership is limited to men who have served in an executive capacity for at least 25 years with district firms engaged in the manufacturing or processing of metals. Ott Hammer, division president of Security Engineering Division, Dresser Operations Inc., Whittier, Calif., is secretary.

Directors include: Delbert Axelson, retired, Axelson Mfg. Co.; William Batchelor, General Electric Co., Ontario; W. A. DeRidder, retired, General Metals Corp.; W. W. Farrar, Farbest Corp.; Robert Gregg, Reliance Regulator Division, American Meter Co.; Jim Griffin, James H. Griffin Co.; E. V. Grover, Apex Steel Corp. Ltd.; E. M. Jorgensen, Earle M. Jorgensen Co.

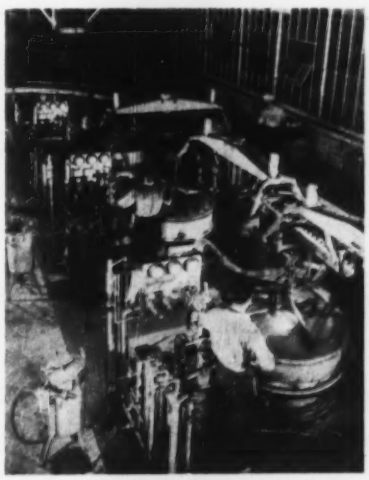
Also, L. D. Kay, Kay-Brunner Steel Products Inc.; J. C. Meyer, Snyder Foundry Supply Co.; K. T. Norris, Norris-Thermador Corp.; M. B. Pendleton, Plomb Tool Co.; J. B. Rauen, United States Spring & Bumper Co.; A. G. Roach, Columbia - Geneva Steel Division, United States Steel Corp.; L. J. Soracco, Bethlehem Pacific Coast Steel Corp.; J. D. Spalding, National Supply Co.; R. A. Stumm, Southern Pipe & Casing Co.; R. H. Taylor, Union Oil Co.; C. B. Tibbetts, L. A. Steel Casting Co.

Los Angeles Plans Steam Plant

Los Angeles Department of Water & Power will build an $85-million steam plant in Long Beach, Calif., to generate electricity for anticipated future needs.

Atlantic Steel Expands

Atlantic Steel Co., Atlanta, will increase its Warehouse Division facilities by 50 per cent. The addition of 37,800 sq ft of floor space to its warehouse (bringing the total to 100,000 sq ft) will be used chiefly to stock heavy structural steel and allow the firm to expand its product line. A large friction saw for cutting structural sections and a shear capable of cutting sheets up to 144 in. long will be installed. The structure, together with overhead cranes and other equipment, will cost about $275,000 and is expected to be completed in six months.



Piercing the Steel Wall

Here's how Griffin Wheel Co.'s Chicago plant reduces the cost of putting hub holes in freight car wheels. While the castings are still hot, hubs are cut by oxy-acetylene flame. Linde's powder starting process makes it possible to pierce the 14 inches of steel. Iron-rich powder, which raises the reaction heat, is forced into the cutting oxygen stream by dispensers. After the initial cut, powder is turned off and the job is finished by flame-cutting

Farm Tools Sells Product Line

Pittsburgh Forgings Co., Coraopolis, Pa., purchased the manufacturing rights for the line of farm implements and equipment of Farm Tools Inc., Mansfield, O. The agreement includes patents, designs, good will, trade names, tools and dies but not the corporate entity of Farm Tools Inc. or buildings.

Enters Nylon Fastening Field

Anti-Corrosive Metal Products Co. Inc., Castleton-on-Hudson, N.Y., is in the all-nylon fastening field. It has established an on-hand inventory of these products, which will supplement its stainless steel stock.

Armco Builds in Kansas

Armco Drainage & Metal Products Inc., a subsidiary of Armco Steel Corp., Middletown, O., plans to build a $300,000 fabricating plant at Topeka, Kans. Replacing the plant now there, it will double the company's production of corrugated metal pipe in the Kansas-Missouri area. Manufacturing will begin in April 1955.

Plans Steel Rolling Mill

Sites in Calgary and Edmonton, Alta., are being considered for a $2-million steel rolling mill to be built in that province. K. W. Dalglish, president of United North Atlantic Securities Ltd., Montreal, Que., says the projected merchant bar mill will have an annual capacity of 30,000 tons. An electric furnace will melt scrap steel.

Forms Equipment Division

United States Hoffman Machinery Corp., New York, combined its Air Appliance and Industrial Filtration divisions into an Industrial Equipment Division. Manufacturing operations will be continued in Syracuse, N. Y. Hyman Marcus, president, announced pro-

motion of Revis L. Stephenson to vice president in charge of the new division.

Equipment Firm Expands

American Research Corp., builder of environmental test equipment, erected an addition to its Bristol, Conn., plant. This expands its manufacturing floor space by 70 per cent, its production capacity by 100 per cent.

Aeronca Buys Research Firm

Aeronca Mfg. Co., Middletown, O., purchased Industrial Research Laboratories, Baltimore, and will operate it as a division.

Renner Mfg. Opens Plant

Renner Mfg. Co. opened its $250,000 plant at Milwaukee. The building contains 30,000 sq ft of floor space and provides facilities for more and larger weldments than were available in the old plant.

Alcoa Subsidiary To Build

Aluminum Co. of America, Pittsburgh, will erect a sales office building for its subsidiary, Aluminum Cooking Utensil Co. Inc., at 4303 Belleview, Kansas City, Mo. The company has installed two new hydraulic forging presses of 1500-ton capacity in a newly constructed building at its Vernon Works, 515 Alcoa Ave., Vernon, Calif.

Lynch Consolidating Operations

Lynch Corp. will transfer its Packaging Machinery Division from Toledo, O., to Anderson, Ind. The firm is consolidating manufacturing to reduce costs. The Toledo plant will be offered for sale after the transfer is completed.

Grand Rapids Firm Renamed

Metal Office Furniture Co., Grand Rapids, Mich., changed its corporate name to Steelcase Inc. The company recently completed its fourth manufacturing plant in that city.

Firm To Make Welding Fittings

Zidell Machinery & Supply Co., Portland, Oreg., and Clyde Tube Forgings Ltd., Glasgow, Scotland, plan to establish a welding fittings factory in Portland. The plant will be operated by a new million-dollar corporation to be known as Clyde Tube Forgings of America. Machinery and equipment for the plant are being manufactured in Glasgow and will be in operation by May of next year.

White Motor Co. Expanding

White Motor Co. of Canada Ltd. is constructing a $750,000 sales and service building at 5645 Royalmount Ave., Montreal. Henry J. Nave is president.

White Motor Co., Cleveland, opened its $500,000 truck sales and service headquarters at 1136 Western Ave., Pittsburgh. Robert F. Black is president. Young White Trucks Inc., 1307 Third St., Canton, O., was appointed distributor in that district.

American Air Filter To Build

American Air Filter of Canada Ltd. will build a plant in St. Laurent, Que. Investment in the project of this wholly owned subsidiary of American Air Filter Co. Inc., Louisville, will be about $250,000. The firm makes industrial dust control, air filter and heating and ventilating equipment.

Perfex Forms New Division

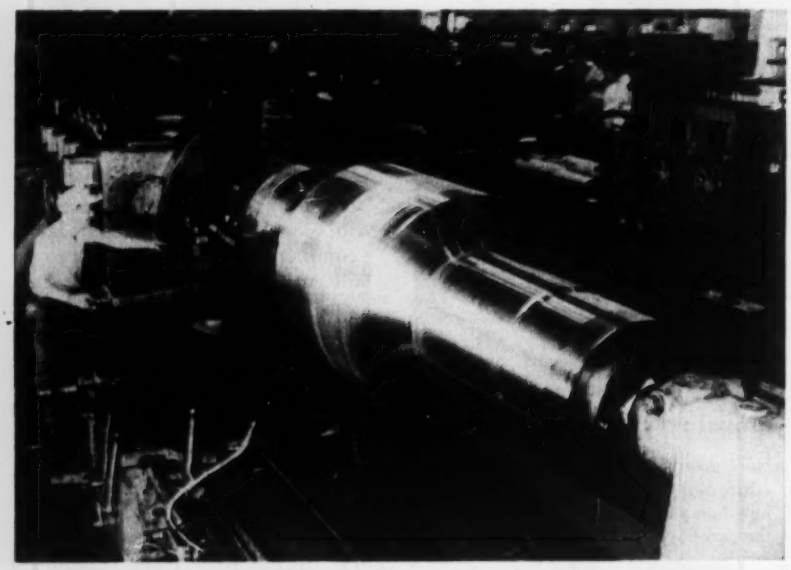
Perfex Corp., Milwaukee, entered the refrigeration and air conditioning field. Through its newly formed Refrigeration Division, it will make coils for room and residential air conditioning units, self-contained equipment, automotive cooling units, chilled water systems, hot water heating, portable refrigeration and air conditioning units. W. K. Watts is division manager.

Steel Tubing Firm Expands

Baker Steel & Tube Co. will construct an addition to its warehouse at 1406 Calzona St., Los Angeles, to increase production of steel tubing.

Selas Buys Houston Plant

Selas Constructors Inc., Houston, subsidiary of Selas Corp. of America, Philadelphia, purchased the plant and physical assets of Southwest Steel Plate Division, Houston. The sale did not include the company per se, which continues to operate as Southwest Industries,



Massive Alloy Steel Forging Loses Weight

This alloy steel rough forging for a blooming mill pinion is being turned down to size on a 60-in. engine lathe at United States Steel Corp.'s No. 2 machine shop at Homestead, Pa. The forging is 14 ft long and has an outside diameter of 48 in. Shipping weight will be 47,000 lb. The lathe is one of three Mackintosh-Hemphill engine lathes in the shop. Tooling is Kennametal tungsten carbide

using leased space from the new plant owner. It makes oil field equipment and gas compressors. Selas Constructors Inc. makes heat units for the chemical industries.

Falco Machine To Expand

Falco Machine & Tool Co. is constructing a 32,000-sq-ft building at 16020 S. Broadway, Glendale, Calif. Production of electronic and tooling equipment will be expanded.

Pennsalt Acquires Gilron Line

To expand its line of metal processing chemicals, Pennsylvania Salt Mfg. Co., Philadelphia, acquired all patents and assets of Gilron Products Co., Cleveland, maker of drawing compounds and metal cleaners. Pennsalt recently purchased I. P. Thomas & Son Co., Camden, N. J.

Scandia Mfg. Co. To Build

Scandia Mfg. Co., Baltimore, manufacturer of small electronic parts, acquired property behind 510-520 Brunswick St., that city, for the erection of a 10,000-sq-ft factory building.

Will Expand Battery Plant

Gould-National Batteries Inc., St. Paul, decided to expand its Houston plant 50 per cent before production started on Dec. 1. More than 19,000 sq ft of manufacturing space will be added and equipped at an estimated cost of $200,000. The addition is slated to be in production next March.

Trans-Main Broadens Service

Trans-Main Corp., a division of R. D. Fageol Co., Kent., O., purchased the torque converter parts inventory of the Motor Coach Division of General American Transportation Co., Chicago. Trans-Main has taken over the servicing of converters in Aerocoach busses, marking another step in the firm's expansion and diversification program. Fageol is a large manufacturer of degassers and fuel cutoff valves for busses, motor trucks, industrial lift trucks, military combat and other vehicles.

REPRESENTATIVES

Warehouse distributors for **Kaiser Aluminum & Chemical Sales Inc.**, Oakland, Calif., have added an extensive line of new aluminum products to their sheet, plate, rod and bar stocks. New products include rectangles, squares, structural shapes, tubing, pipe, standard truck body and truck trailer aluminum sections. The company also appointed Liberman & Gittlen Metal Co. Inc., Grand Rapids, Mich., as a distributor of aluminum ingot.

Naresco Equipment Corp., Newton Highlands, Mass., named Harry D. Stone Cleveland district sales engineer. The firm is a subsidiary of National Research Corp., Cambridge, Mass., manufacturer of industrial high vacuum equipment.

Cleaver-Brooks Co., Milwaukee, appointed Rex Bircket & Co., Tulsa, Okla., as manufacturer's representative for the sale of its boiler equipment. Cleaver-Brooks makes equipment for the generation and utilization of heat.

Quaker State Metals Co., Lancaster, Pa., appointed E. J. Summerhays and M. A. Ludwig, both of Los Angeles, West Coast representatives for cross corrugated aluminum roll roofing.

Firth Sterling Inc., Pittsburgh, appointed the following distributors for its tips, tools, blanks, toolholder bits, ground flat stock and drill rod: Frey Industrial Supply Co., Los Angeles; A. J. Glesener Co. Inc., San Francisco; Chandler & Farquhar Co., Boston; Electric Tool & Machinery Co., Baltimore; Farquhar Machinery Co. Inc., Jacksonville, Fla.; Brammall Supply Co., Benton Harbor, Mich.; E. C. Blackstone Co., Memphis, Tenn.; Losey & Co., Easton, Pa.

Magnethermic Corp., Youngstown, appointed John L. Hutton Co., Cleveland, its agent for induction heating equipment.

Cochrane Corp., Philadelphia, appointed Turbine Equipment Co., Glen Falls, N. Y., its representative for upper eastern New York state. The company offers water conditioning equipment, steam specialties, condensate booster and return systems.

NEW ADDRESSES

Drever Co., builder of heat-treating furnace equipment, moved to Red Lion Rd. and Philmont Ave., Bethayres, Pa.

ASSOCIATIONS

The American Foundrymen's Society established permanent national headquarters in its building at Golf and Wolf roads, Des Plaines, Ill. AFS President Frank J. Dost, president of Sterling Foundry Co., Wellington, O., dedicated the building. The project represents an investment of about $300,000.

Winners of the 1954 machine tool awards announced at the annual meeting of **American Society of Mechanical Engineers** are: F. G. East, vice president and general manager, Hamilton Machine & Gear Co., Toronto, Ont.; and G. N. Levesque, director of research, Brown & Sharpe Mfg. Co., Providence, R. I. H. R. Westcott, chairman of ASME's board of honors, conferred the awards.

Vertical Turbine Pump Association, Los Angeles, elected Warren L. Bremer president. He is vice president of Layne & Bowler Pump Co., that city. Other officers are: W. H. Reeves, Layne & Bowler Inc., Memphis, Tenn., vice president; B. A. Tucker, Peerless Pump Division, Food Machinery & Chemical Corp., Los Angeles, secretary-treasurer.

The **Steel Club of Philadelphia** elected officers: J. Russell McCarron, Vanadium-Alloys Steel Co., president; T. M. Gloeckner, Republic Steel Corp., vice president; Dwight L. Merrill, United States Steel Corp., secretary. C. W. Diven Jr., Sharon Steel Corp. and A. W. Taylor, Carpenter Steel Co., were named directors.

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CANADA, RAILWAY & POWER CORP., LTD.
EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY
117 Liberty Street, New York 6, New York

STEEL

December 27, 1954

Technical Outlook

BOON TO SURVEYORS—Using a fundamental constant—the speed of light— a new electronic-optical device for determining precise geodetic distances is under test by the Army's Corps of Engineers. Measurements are obtained by determining indirectly the time interval for a light beam to travel from the instrument to a distant plane mirror and back to the instrument. Range is up to 50 miles on a clear day.

CENTRIFUGAL-CAST TITANIUM—Production of successful true centrifugal castings of titanium is announced by Armour Research Foundation. Under program sponsorship of Wisconsin Centrifugal Foundry Inc., Waukesha, Wis., a number of castings weighing from 3 to 9 lb have been produced. Researchers claim that the equipment and technique prevents contamination from furnace and mold materials and also results in superior surface finish.

TRANSFORMERS IN THE BAG—Starting Dec. 1, General Electric's distribution transformer department is shipping all units through 167 kva in polyethylene bags. Since many utilities store transformers some time before use, the bags will maintain factory freshness without any danger of attack by moisture or dirt. In some instances this attack has been more injurious than the actual service conditions, since transformer operating heat evaporates any collected moisture.

WATCH SILICON—This abundant metal is fast catching up to germanium, glamor girl of the semiconductors. Big drawback is the delicate technology required to refine the metal to almost-perfect purity, and then produce it in single crystal form.

Development transistors and rectifiers show silicon can do many electrical jobs handled effectively by germanium: Amplify weak currents many thousand times, rectify alternating current to about 200 v with great efficiency.

Expect silicon rectifiers to begin appearing on the market. One advantage they exhibit over present germanium rectifiers is the ability to perform at temperatures over 400° F.

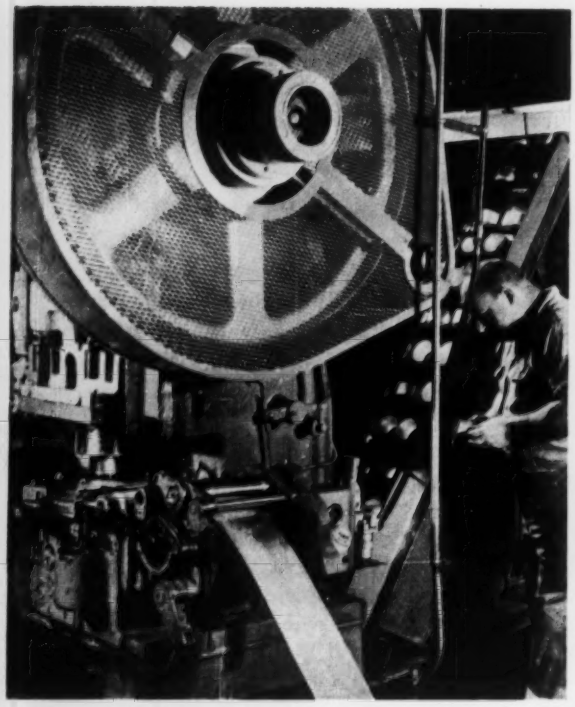
QUIETER—Noiseless automobiles were predicted by D. C. Apps, GM Proving Grounds at the fifth annual National Noise Abatement symposium sponsored by Armour Research Foundation. He said that the automobile engine of the future will be so quiet the driver will have to check the oil pressure gage to see if it is running. It was predicted that the jet-powered plane of 1970 will incorporate a double fuselage at least 8 in. thick, just to reduce noise.

DEBUT—The world's first oil derrick made entirely of aluminum is in service in an Oklahoma oil field. It's a telescoping type for use on a portable oil field servicing unit with square tubular aluminum legs and bracings. Weight saving was 40 per cent.

FIREBRICK WEAR—By imbedding radioactive pellets in firebricks, one refractory company thought it had solved the problem of checking wear inside a furnace without shutting down. But the steel company's union bricklayers refused to handle the bricks and wouldn't allow company engineers to put them in place. So one more good idea goes on the shelf for the time being.

SMALL SCREEN—Corning Glass says they are making 300-mesh precision glass screens containing over 90,000 holes per square inch (so small they cannot be threaded by a human hair). They are used as part of a cathode ray tube. Prior to use of glass, these components were usually made of copper by an electroplating process.

Metalworking Outlook—p. 19 *Market Outlook—p. 85*

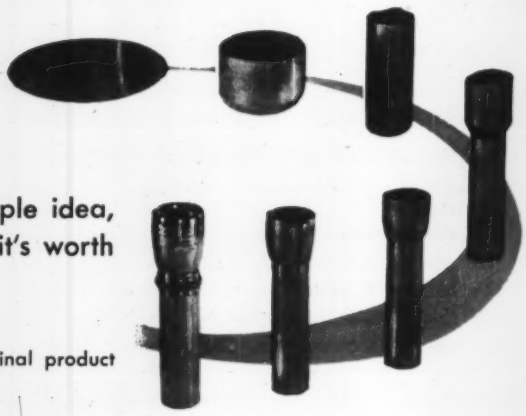


1 First steps: Blank is stamped and cup drawn

2 Frist deep draw. Cup becomes a tube

Short-cut Fabrication

Drawing flashlight cases from steel was a simple idea, but the execution took a lot of doing. Now it's worth a fortune to the manufacturer



Manufacturing sequence, blank to final product

IT'S ONLY a simple flashlight, but it saved the company $100,000 last year.

That figure alone is enough to justify the shift to copper-coated steel strip for flashlight cases at the Blake Mfg. Div. of Ray-O-Vac Co., Clinton, Mass. But another benefit came, too: The new case looks just like the old one, but it will laugh at rough treatment that would smash the old one flat.

Coated Strip — When attempts by Blake to draw a satisfactory steel case hit a snag, Thomas Strip Division of Pittsburgh Steel Co. came up with a special drawing quality steel with an electrolytic coating of copper.

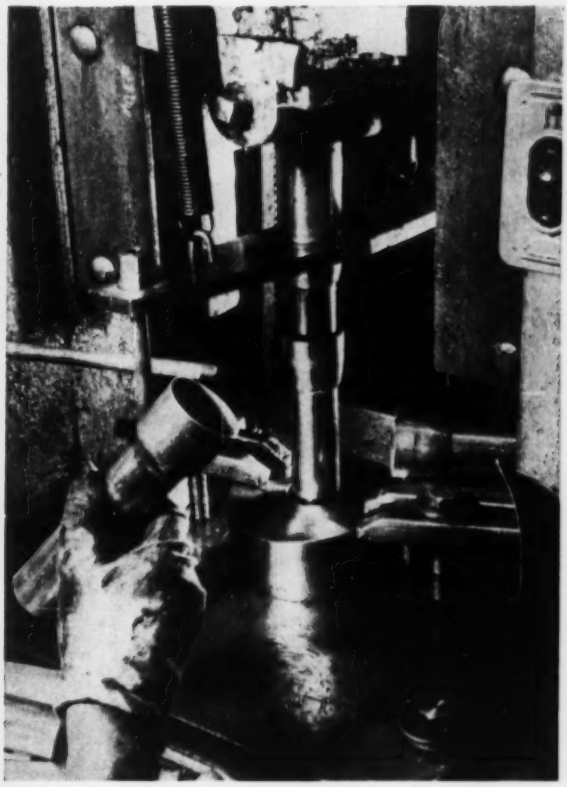
The steel is furnished in 450-lb coils. It is 0.020 gage, 6-9/16 in. wide and copper coated on both sides. The coating makes a good die lubricant and plating base.

Deep Draw — The drawing sequence starts with a 6.398-in. diameter blank. First draw produces a 3⅛-in. cup. Redraw press turns out a 5-in. tube in two draws. Two more draws reduce the case to final diameter, form and shape the head. No annealing is required. Final operations trim the head, roll thread it and knurl the case.

Finishing sequence includes a heavier copper plating, buffing and polishing and chrome plating before the cases are ready for the assembly line. Production rate is about 1400 pieces an hour.

Savings on each case run 3 to 6 cents, depending on the model, and have made possible elimination of two annealing and pickling operations and one redraw.

3 Final reduction. Flashlight head is formed



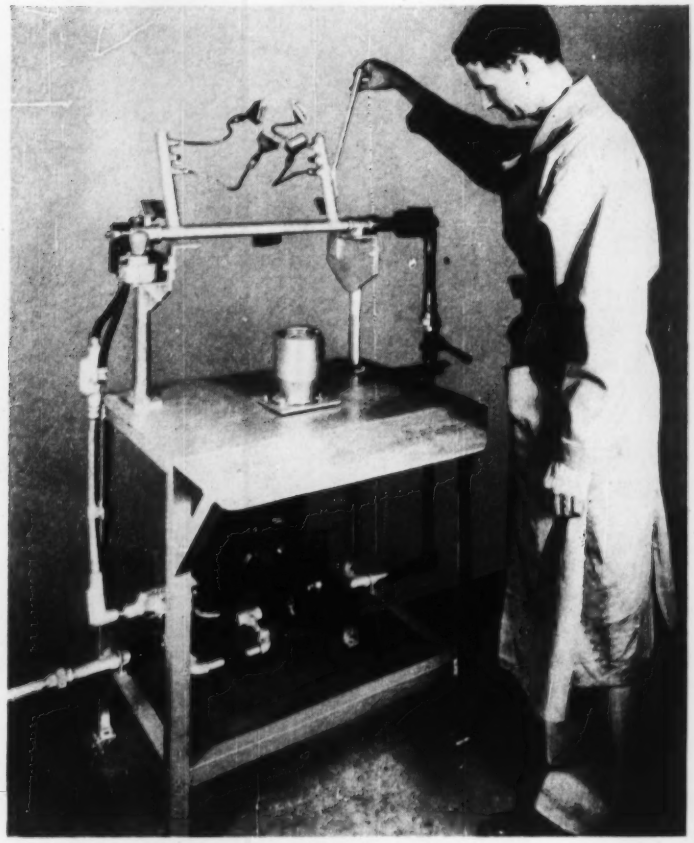
4 Shaping the head. Knurling and threading come next

5 Plating. First more copper, then chrome

6 Final assembly. Eight lines turn out 30,000 a day

Semi-automatic gas-fired machine turns out one complete assembly every 80 seconds. All controls are automatic in this tricky brazing operation

By CHARLES A. McFADDEN
Selas Corp. of America
Philadelphia



This compact, precision-heating unit production brazes aluminum heating elements to bottoms of aluminum carafes at 45 per hour. Fuel costs are 0.1 cent per utensil

New Idea in Gas Brazing Aluminum

GOT AN ALUMINUM brazing problem? A semiautomatic setup used by Tricolator Co., Newark, N. J., may provide the answer you're seeking.

The new machine incorporates air-gas burners for production brazing of a heating element to the bottom of a spun pitcher-shaped container only 0.040 in. thick. The technique is gaining widespread application in the appliance industry for such items as deep fat fryers, casseroles, skillets and roasters.

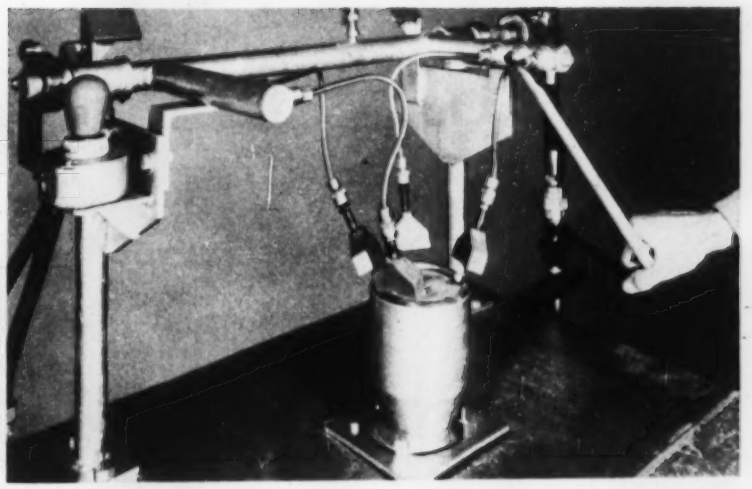
Brazing an aluminum-sheathed heating element directly to the bottom of an aluminum cooking utensil increases the heat transfer efficiency as much as 400 per cent. This results in lower operating cost, faster response to thermostatic control and decrease in temperature range variation. It also permits larger capacity appliances to be built for conventional kitchen outlets.

The Requisite—Tricolator's heating element is a sheath formed from aluminum tubing with Nichrome resistance wire centered inside the tube and protected from short circuiting by ceramic insulation. Their prime concern is not so much the strength of the braze as an intimate and direct contact of the assembly components. Extended air gaps between the element and the pot would cause localized hot spots on the element and premature failure.

Aluminum brazing produces joints having strength and corrosion resistance comparable to welded joints, and it is generally more economical. Temperature differential between the flow point of the brazing alloy and the softening point of the parent metal is generally less than 50° F, necessitating precision control of the brazing heat.

The process used by Tricolator was developed by Selas Corp. of America, Philadelphia, and in this particular application the burners are fixed in position and each has

Preplacing the brazing alloy wire speeds the brazing process and eliminates uncertainties of hand feeding



When burner assembly is rotated into position, burners go on high fire and timing mechanism is started. After brazing alloy flows into joint, burners throttle to low and then cut off for cooling

a gas cock to permit regulation of the heat pattern. Heating is electrically timed, about 40 seconds for this job. Cooling, unloading and reloading take another 40 seconds.

Cleaning—Cleaning of parts to be brazed is generally done by an etching method: Immersion of the part in caustic soda solution followed by water wash, followed by a nitric acid dip, followed by another hot water wash. Filler wire or brazing alloy gets the same treatment.

If you're brazing heavier and larger aluminum sections, different methods of heating are necessary, although the basic heat application technique remains the same.

A Heavier Job — For example, more heat is required in simultaneously brazing a heating element and three studs to the bottom of a ¼-in. thick deep fat fryer. If all of this heat were applied from the outside, burning or melting of the element sheath would result. Burners are therefore installed on the inside of the vessel to fire against its bottom to bring all three studs and the element up to brazing temperature with the pot.

The equipment in the illustrations is most applicable for new and low production items. Low initial investment permits sufficient parts to be turned out to test customer reaction to a new appliance.

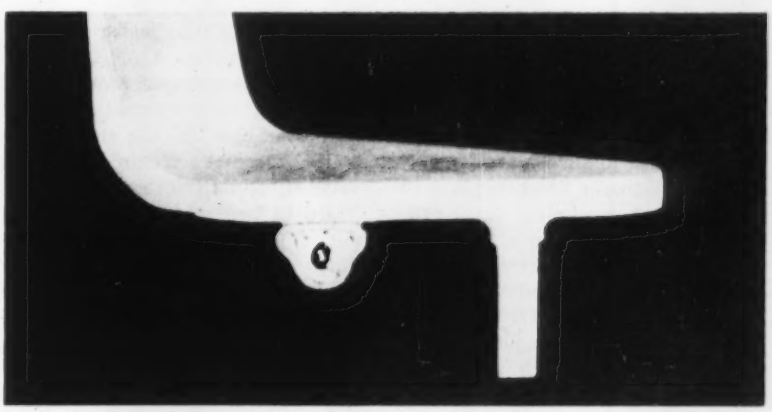
When your production requirements for a single type appliance approach 1000 or more a day, automatic machines are indicated.

It's Compact—Selas has a 12-brazing-station fully automatic machine in the design stage. It'll incorporate several heat stations mounted within a 90 degree sector of a dial conveyor or turntable. A single operator will be able to turn out 950 units a day on a machine which requires only six sq ft of floor space.

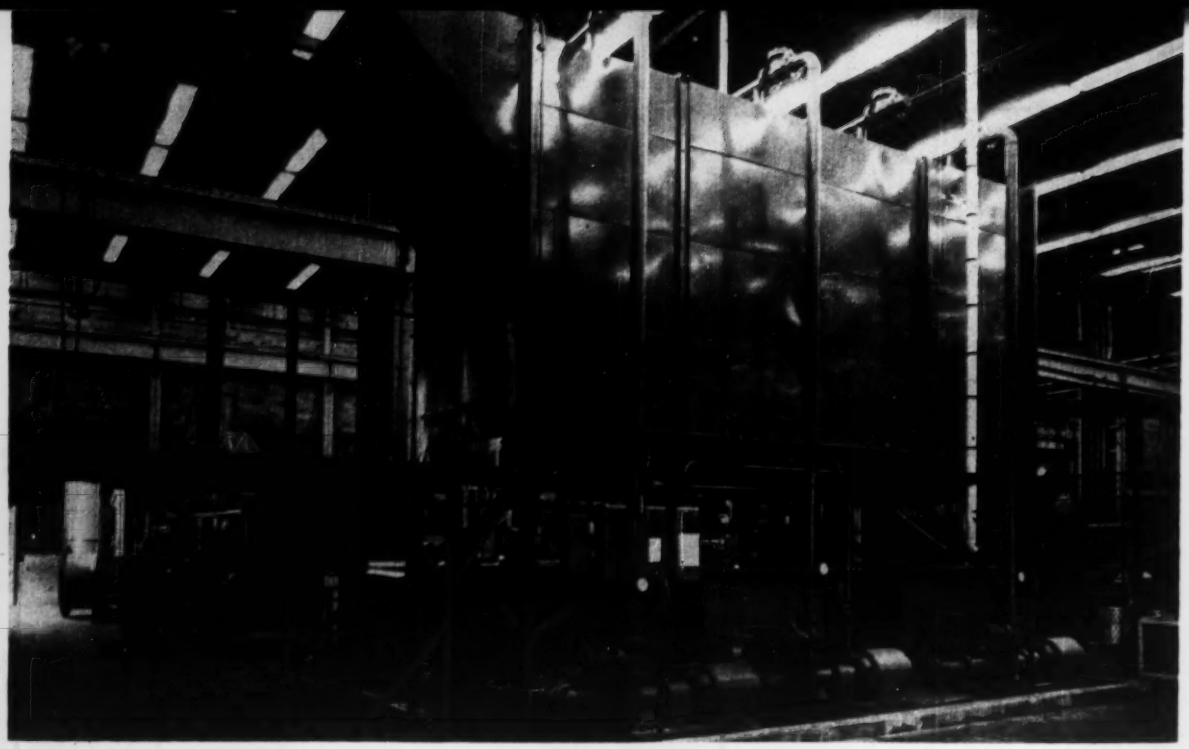
The machine's conveyor will move forward one station at a time. Preassembled and fluxed pots will be carried from the load-unload station through various heating and cooling stations back to the load-unload point. Basic heating time for heavy utensils is about 75 seconds, but the use of several heating stations operating simultaneously permits development of adequate preheat before brazing.

In addition to economy and compactness, Selas officials are claiming these features on its dial-type automatic machine:

1. The operator loads and unloads a cold pot. Several cooling stations are provided to assure that the brazing material has solidified and the pot is cooled.
2. Heat stations are completely removed from the operator by draft shields to assure satisfactory working conditions. Shields also keep the heat where wanted and prevent outside drafts from affecting the quality of work.
3. All burner equipment and heating stations are used at maximum efficiency at all times because the pot is cooled in a separate zone.



Section view of the utensil with ¼-in. thick bottom shows completed brazed joint. The intimate contact between element and utensil provides for optimum heat flow



Conversion coating unit. Spay washer above, solution storage tanks and pumps below. Rinse tank is divided into 800 and 1200-gal sections

Condensed Conversion Coating

Over-under construction utilizing a spray washer solved a short run coating problem for bulky ordnance parts. The installation cuts handling to a minimum

SOMEONE must have watched his wife do the laundry with an automatic washer. The idea of all those changes of water with no inbetween handling turned up in an industrial application.

At the General Electric plant in Pittsfield, Mass., bulky naval ordnance items are given a five-stage chemical protective treatment in one big tank. Instead of moving the parts, they move the solutions.

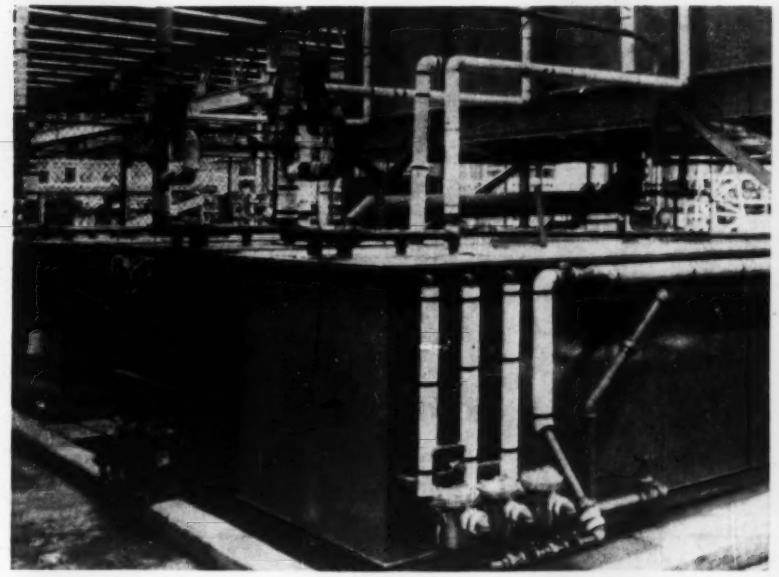
Five in One—Treatment is the Alodine process which gives aluminum an amorphous phosphate conversion coating. Ordinarily, it would take 5 tanks to perform the sequence: 1. Buffered alkali cleaning. 2. Clean water rinse. 3. Alodine coating. 4. Clean water rinse. 5. Acidulated water rinse.

Instead, this corner-cutting installation uses one big chamber on stilts where the treatment is performed, and three tanks (one divided in two parts) underneath it for holding the solutions. Solutions are raised to the treatment tank by pumps, and removed by a bottom drain.

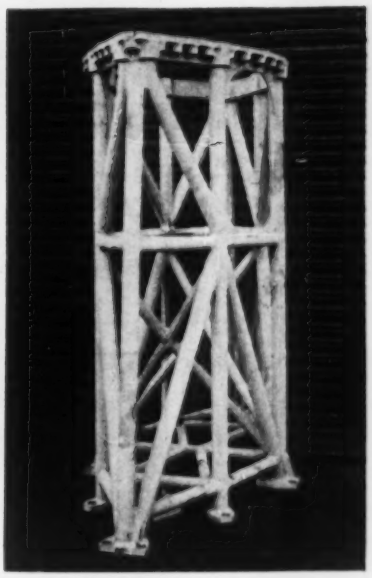
Minimum Handling—The nature of the parts to be treated inspired the unusual installation. Typical is a cat's-cradle base for a shipboard radar, awkward to handle and produced in too small volume to justify the usual five-stage power washer or space-consuming immersion installation.

The telescoping of five stages of spray processing into one is made possible by a co-ordinated system of piping and valves and one common spigot-like drain which removes the solutions to their reservoir tanks.

Makers — The machine, constructed by Newcomb Detroit Co., on a design worked out with General Electric and American Chemical Paint Co., was put in operation in October, 1952. The spray chamber is a rectangular box, welded and reinforced, enclosing



Holding tanks. Spigot drain from spray chamber is indexed over center tank



Radar base, typical of parts coated

spray piping and nozzles of stainless steel.

The pumps are operated by a pushbutton. Pump control and the indexing mechanism for the drain are centrally located. The pump motor serving the Alodine tank is controlled by an automatic timing device to prevent operation beyond a predetermined time limit.

Alkali, Alodine and final rinse tanks are steam heated, and all tanks are of mild steel, except the one containing the Alodine solutions which is made of stainless steel.

Protection—The amorphous protective coating formed in the process has a number of characteristics important for naval ordnance items:

1. Salt spray resistance is comparable to that provided by chromic acid anodizing.
2. Bimetallic corrosion (galvanic corrosion) resistance is excellent.
3. Paint-bonding is equal to that provided by chromic acid anodizing.

In another application it is being used for aluminum electronic parts for shipboard use that had previously been silverplated. This coating, unpainted, provides excellent protection against the corrosion and pitting that marred the surface formerly silver plated.

CONVERSION COATING LINE

Spray chamber: 14 gage type 304 stainless steel, mounted above solution holding tanks

STEP 1—CLEANING

Solution: Ridoline No. 46 (a silicate alkali) and Ridosol No. 71 (an organic solvent emulsion)
Application: 800 gpm spray for 2 minutes at 140-150° F
Drain time: 1 minute
Disposal: To alkali tank for reuse
Holding tank: 2000 gal capacity, ¼ in. cold rolled steel plate

STEP 2—WATER RINSE

Application: 45-60 seconds spray at room temperature
Disposal: To sewer
Holding tank: 800 gal capacity, ¼ in. cold rolled steel plate

STEP 3—ALODINE SPRAY

Application: 800 gpm spray for 45 seconds at 110° F
Drain time: 1 minute
Disposal: To Alodine tank for reuse
Holding Tank: 2000 gal capacity, type 304 stainless steel

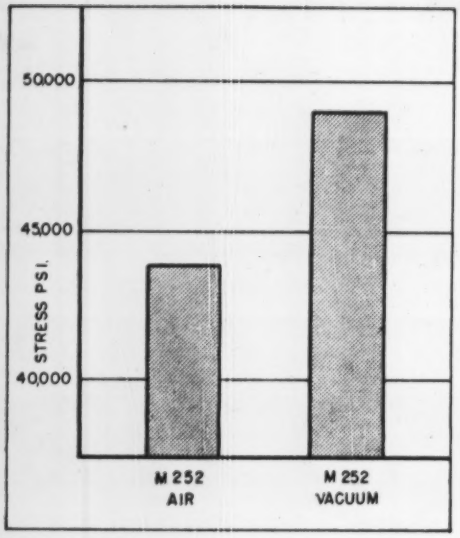
STEP 4—WATER RINSE

Application: 45-60 seconds spray at room temperature
Disposal: To rinse tank; excess to sewer
Holding tank: Same tank as for step 2

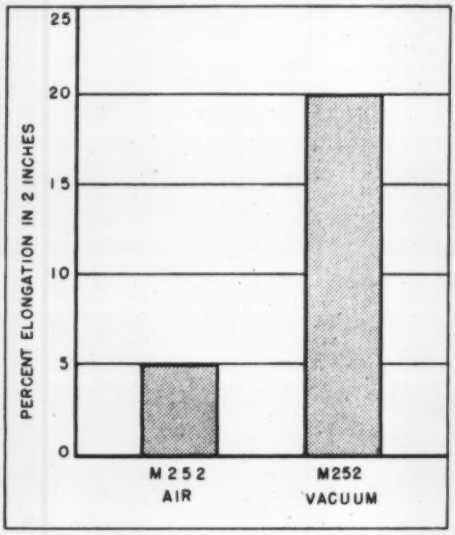
STEP 5—FINAL RINSE

Solution: Water acidulated to pH 3½ with Deoxylyte No. 37 in proportion 1 volume to 200 volumes of water
Application: 45-60 seconds at 140-150° F
Disposal: To acidulated water rinse tank
Holding tank: 1200 gal, ¼ in. cold rolled steel plate

What Vacuum Melting Does for Alloy M252



Fatigue Strength, at 1500°F and 10^8 Cycles



Tensile Ductility at 1350°F

Vacuum Melting States Its Case

WHY MELT UNDER VACUUM when melting costs run $1 to $3 a pound? All metalworking is asking that question with increasing frequency. Carboloy Department of General Electric Co., recently embarked in the vacuum melting business, has an answer all prepared.

Bigger Yield—A recent estimate holds vacuum melting to be 10 times cleaner than electric furnace melting. That means bigger yield from the ingot.

Yield of one high-temperature material is increased from 45 per cent (air melting) to 65 per cent. The improved yield shows up in the shop in better workability and lower rejection rates. Rejection rate on ball bearings produced from AISI 52100 steel was reduced 40 per cent.

Improved Physicals—Forgeability, workability, ductility all go up. Ductility can sometimes be doubled by vacuum technique as the result of cleanliness and elimination of minor elements. Tensile and rupture strengths improve.

Fatigue strength rises, both at room and elevated temperatures. One company reported an increase in fatigue strength of 52100 steel from 85,000 psi (air melted) to 125,000 psi (vacuum melted). Fatigue strength of M-252, a nickel-base jet engine alloy, can be upped 10 to 15 per cent at 1500°F.

New Materials—It's a good deal easier to use hardening elements such as titanium, aluminum, zirconium and vanadium when the air is removed. One alloy, 1570, can't be satisfactorily produced by air melting.

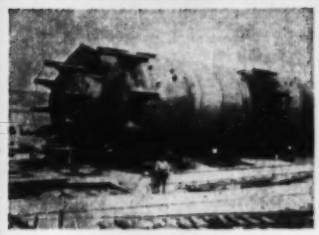
For other new alloys, still in the laboratory, vacuum melting will be the method of choice. Look for greater corrosion resistance, better magnetic properties and exceptional damping qualities from some of these.

Higher yield
Better workability
Increased ductility
Improved fatigue strength
Closer composition control
Gases removed
Greater cleanliness
New alloys possible
Increased uniformity

AVONDALE

Now 4 Divisions and

More Steel Than Ever



Main Plant — Avondale, La.
Steel Reactor Tanks

Service Foundry — New Orleans, La.
Stainless Steel Propellers

Harvey Plant — Harvey, La.
All types of steel repair

Avoncraft Division — Avondale, La.
Porcelain Enamel on Steel Products

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Part 6

Correlating Blast Furnace Operating Concepts

Present practice was built around raw materials that had favorable characteristics. Author cautions that now is time to prepare data for lower-grade materials

By CHARLES E. AGNEW
Consultant
Blast Furnace and Sintering Plant Operations
Cleveland

USE of volatile-bearing burden materials requires the delivery of heat to the work division of preparation for smelting in sufficient volume to evolve the volatile matter; use of volatile-free burden materials requires conservation of heat in the smelting division of work. Obviously the term "successful use" is one which must be used with careful discrimination. Since numerous furnace operations have demonstrated (with adjustment in the blowing rate) that higher sinter/coke burden ratios can be carried than natural ore/coke ratios, and a greater percentage of the latent heat which is taken from the smelting operation by gas can be returned to it with blast temperature, the fallaceous nature of the belief that the blowing rate should be determined by furnace lines is brought to light.

Simplifies Smelting Practice — Pilling favored the use of sintered magnetite fines over the use of natural magnetite ore because he believed sinter reduced more easily than ore. In the light of the development in the use of magnetite ore sinter in the Eastern district subsequent to publication of Pilling's paper, and the progressive increase in the use of sinter throughout the industry within recent years, it is of interest that Pilling does not make any reference to existence of iron silicates contained in sinter, or to the possible effect of such compounds upon the reducibility of Fe. Probably the existence of iron silicate compounds in sinter was not generally recognized at the time of Pilling's experiments. However, the fact that he could see an advantage in the reducibility of Fe from sintering as compared to natural ore, even though his sinter must have contained a substantial percentage of iron silicates, is a point of interest.

Although iron silicate compounds have always existed in several burden materials commonly used for many years (sinter, nodules, open-hearth slag, mill cinder, roll scale, etc.) their existing percentage in relation to other iron compounds in the total burden has always been in a minor ratio. In past years all of these materials were considered as secondary burden materials with natural ore being the primary material; consequently, little or no consideration was given to the nature of iron compounds contained in the secondary materials, or to the possible effect they might have upon the reducibility of Fe. However, since sinter became a primary burden material for many furnace operations in the past decade the existence of iron silicates and the effects therefrom upon furnace productive capacity and operating economy, has become one of the most controversial subjects among furnacemen.

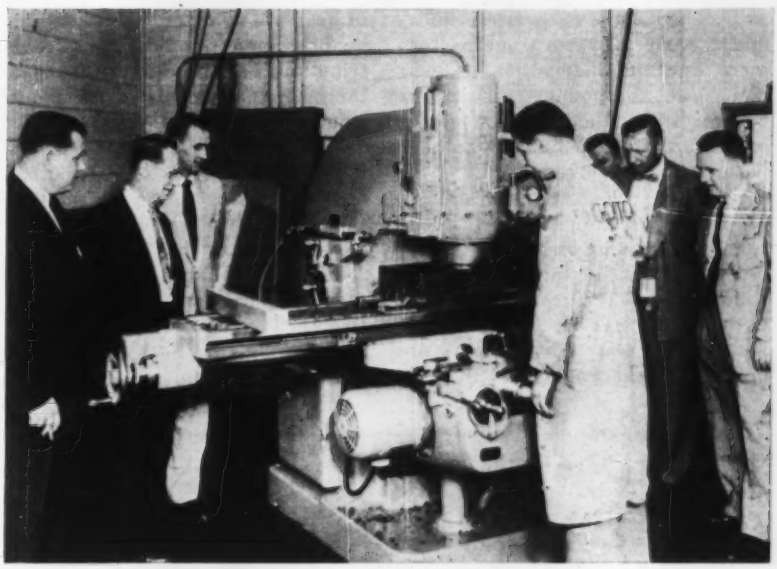
Calls for Review—Because of the virtual certainty of further increased use of sinter and other products from ore beneficiation processes which now confronts the industry a clear understanding of effects from the iron silicates is a matter of paramount importance to all personnel associated with blast furnace operation. Here is another phase of furnace practice requirements and effects which calls for a review of available particulars with careful discrimination.

When the cause and effect of iron silicate compounds contained in sinter, as conclusively demonstrated in numerous actual furnace operations, are analyzed it becomes evident that the controversy regarding the value of sinter as a burden material is one of differences in interpretation of effect rather than recognition of it.

In the light of the principles of both the practical and technical sciences of furnace operation the elimination of volatile matter from burden materials, effected through sintering, requires an adjustment in heat distribution between the two divisions of furnace work. From this premise the effect of iron silicate compounds upon furnace operating economy is limited to their effect upon distribution and recovery of heat—not upon any change in heat requirements for Fe reduction.

Technical science teaches—

1. Silica in the presence of fusing temperature will seek union with a base.
2. One or more bases may be present in a silicate compound.
3. Bases commonly present in blast furnace burden materials are the oxides Al_2O_3, CaO, MgO, and one or more of the oxide forms of manganese, phosphorus, and iron.
4. The degree of temperature required for fusion varies with the ratio to each other of the constituents which are fused.
5. Since the existing percentages of each of the base constituents cited in paragraph No. 3 can, and do, vary widely in their ratios to silica (SiO_2), and to each other, the silicate compounds formed with fusion can, and do, have a wide range in chemical composition.
6. When iron-bearing materials are sintered and the sum total of all bases present, other than iron, is not enough to satisfy the existing percentage of silica the excess silica will satisfy itself with iron oxide alone.
7. Examination of a section of sinter under a petrographic microscope will disclose crystals of iron oxide completely enameled with a coating of silicate. Since the silicate coating must be melted away before the crystal of iron oxide can react with a reducing agent, and any iron oxide compounded in the coating must be dissociated from the silica before it can react with a reducing agent, the reduction of all Fe exisiting in the manner described will be delayed until the fusion temperature of the specific silicate compound composition which is involved has been attained.
8. Ratio of cell space to solid in a particle of sinter will vary with and be determined by the amount of combined volatile matter which is evolved from the material sintered.
9. Structural strength of sinter varies with the chemical composition of the silicate compounds formed during the sintering operation.
10. The degree of sinter structural strength will determine its degree of natural friability and the opportunity afforded thereby for attaining a desirable particle size range from the normal handling of the material between its production at the sintering plant and its charging into the furnace.



Private Show Reveals New Machines

This 3-48 vertical mill was one of six George Gorton-built machines displayed in a private show at Motch & Merryweather Machinery Co.'s Euclid plant in Cleveland. Machines, including new pantographs and duplicating machines, are the new line—will be shown at the Chicago show. M & M's show lasted 5 days, produced better than one quotation for every four visitors—ample evidence as to why small shows are becoming a bigger part of new sales programs

Practical Science Teaches—

1. Excessive structural strength of sinter is just as objectionable as too little because particle size (ratio of surface to mass) determines the attainable degree of gas-solid contact in the furnace and transmission of heat from gas to sinter—which alone makes the reduction of Fe possible.
2. Silicate compounded from silica and iron oxide alone is most objectionable because of the excessive structural strength it imparts to the sinter, therefore, the presence of bases other than iron in the sinter mix in sufficient percentage to satisfy the silica present is most desirable.
3. Control of sinter structural strength lies in the blending of materials to be sintered *before the mix is charged onto the sintering hearth* because after sintering action begins there is no control over silicate compound formation. So called soft sinter is not completely fused.
4. Successful use of sinter produced from a single iron-bearing material, and from blends of two or more such materials in various proportions, furnishes ample proof that iron silicate compounds of themselves are not detrimental to reduction of Fe *in a blast furnace.*
5. Thermal economy of blast furnace operation with the use of sinter or with natural ore is determined by the degree of effectiveness attained in recovery and use of heat—not by the amount of heat generated.
6. Sinter particle size range of minus 1 in. and plus 100 mesh, with the major percentage minus 0.5-in. gives better opportunity for uniform distribution and recovery of heat than larger range in size and less fines.
7. The character of fine particles rather than the property of fineness is the important consideration in heat distribution and recovery.

Because the earthy volatile-bearing fines of natural Lake ores have the tendency to pack when charged into the furnace, and the coarser particles have the tendency to create an easy channel for gas passage through the center of the stock column (conclusively proved by technical science research) substitution of 10 to 15 per cent sinter for natural ore will frequently permit the use of a faster blowing rate than the natural ore alone, but with higher percentage of sinter substitution the initial benefit of the 10 to 15 per cent will be lost.

Lessens Packing—The 10 to 15 per cent of volatile-free cellular sinter serves to lessen the degree

of packing of the natural ore fines and thereby provides a means for more uniform distribution of gas and heat throughout the stock column, and for more effective use of them than is possible with the natural earthy ore alone.

However, when the percentage of sinter used opens the stock column to gas passage beyond the critical stage of maximum gas-solid contact (critical percentage varies with physical properties of natural ore used) all possibility of efficient recovery and effective use of heat will be destroyed unless the quantity and the rate of its distribution is adjusted to the changed thermal requirements of the stock column.

Since the blowing rate determines the rate of heat distribution any adjustment in the distribution rate must be effected through an adjustment in the blowing rate. Reluctance to accept this simple fact by industry personnel who are firm believers in the sanctity of the blowing rate as a principle of furnace operation, rather than a method for serving a principle, is probably responsible for most of the controversy which revolves around the vaule of sinter as a major burden material.

How Compensation Works—Actual furnace operation demonstrates that any loss of production to be expected from a reduction in the stock travel rate through a reduction in the coke combustion rate, can be compensated through the use of a heavier burden and a higher blast temperature (with thermal economy gained thereby), provided the practice methods are adjusted to the changed thermal requirements. Despite this fact there are some operators who reject sinter as a major burden material because it will not permit the use of a faster blowing rate than can be used with natural ore.

If there is one parting thought on this phase of furnace practice which should be studied it is that operating principles, which govern successful use of sinter as a major burden material, will apply with equal force to any other material having comparable properties. Sintered low-grade ores are not as valuable burden materials as sintered ore concentrates because sintering alone does not reduce the fluxing stone requirements. But to the degree that any sinter reduces the need for heat in preparation for smelting it increases the opportunity for conservation of heat in the smelting operation, and the return to the furnace as blast heat of a greater percentage of the latent heat taken from the furnace as carbon monoxide (CO) in top gas.

"No two furnaces work alike" is a belief widely accepted by industry personnel as an unexplainable fact. Obviously, there must be a reason why all furnaces do not work alike. Unfortunately, the general tendency is to gage practice efficiency of all furnace operations by a common standard, based upon comparison of practice data obtained with use of practice methods which currently are most widely used rather than with comparison based upon practice principles which are properly applicable to the specific operating conditions which are being gaged.

The fact that the majority of furnace operations use raw materials which are roughly comparable

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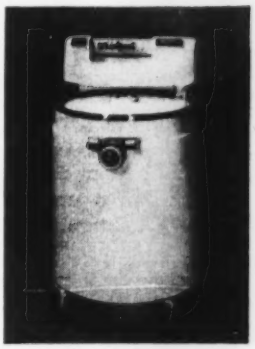
Listening to the Finish

In their search for better ways to treat steel before painting so that finishes last longer, New York University engineering researchers use sound waves to check quality and thickness of various phosphate coatings

in processing requirements, and therefore use practice methods which are roughly comparable in means, does not alter the truth of distinction between principles and methods. In search for refinements in furnace practice for any given operation intensive study of existing operating conditions, based upon teachings of technical science, may disclose some effects and requirements which differ considerably from other contemporary operations which are similar.

History of the iron blast furnace industry of the United States clearly illustrates changes which have occurred in accepted standard practice methods from era to era with major change in character of raw materials used. Also, careful study of the history provides conclusive evidence that American furnace practice has led the world for many years largely because the available raw materials have had natural chemical and physical properties which were favorable to the practice methods used with them. With virtual exhaustion of the better grades of those materials and enforced beneficiation of lower-grade materials to replace them, or use of other raw materials from newly developed sources, it may be said the need for efficient correlation of the practical and technical sciences of furnace operation has never been greater than it is in the present era.

In the study of raw material supply, effects of raw material properties upon conversion economy, and betterment of furnace practice, which currently are subjects of major importance to the entire blast furnace industry, it must be recognized that successful solution of the numerous problems depends upon mutual understanding of them, and concerted action toward their betterment, on the part of management, raw material producer and furnace operator. No amount of knowledge of the technical science of furnace operation will benefit the practical science operator if he is not supplied with raw materials having the characteristics which permit him to exercise his technical knowledge, or is not furnished the accessory equipment which enables him to efficiently meet altered requirements of his operation, and thus benefit from his technical knowledge in preparation for the practical phase of his operation.



The outside shell of the WHIRLPOOL Surgamatic WASHING MACHINE—once composed of two half shells—is now a ONE-PIECE SHELL "WITH TOP BAND" formed by . . .

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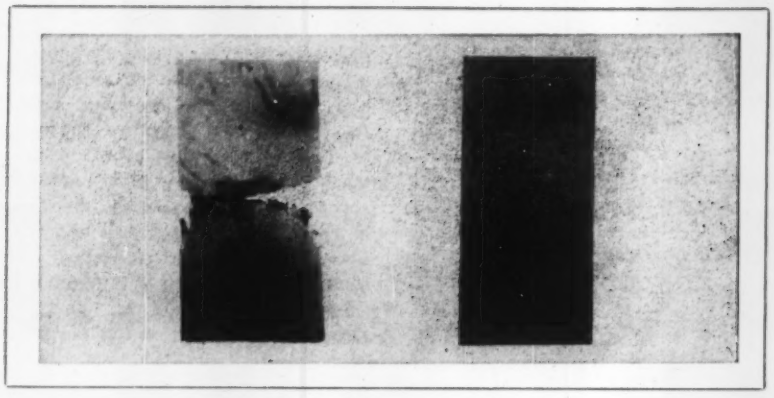
STEEL UNDER TEST

stainless 329 resists hot nitric-hydrofluoric acid in production line test exposures. Life is eight times type 316



TYPE 329 stainless steel offers good resistance to the corrosive attack of certain nitric-hydrofluoric acid solutions. Recent test results prove the alloy useful for equipment where such corrosive liquids are handled in pickling or similar operations.

An eastern manufacturer tried the steel in a production line test exposure after they encountered severe corrosive action on the equipment they were using. Baskets, racks and other parts made from Type 316 stainless had deteriorated rapidly, requiring costly replacement.

Rough Test—To help the plant solve its corrosion problem, Carpenter Steel Co., Reading, Pa., supplied test samples of stainless Type 316 and No. 7-Mo (Type 329). They were immersed in the nitric-hydrofluoric acid solution under operating conditions.

Part of each specimen was held in the quiescent portion of the solution and part was exposed to the aerated condition. Both were exposed (continuously for 117 days) to exactly the same medium as that encountered in normal production—a solution of 17 per cent nitric acid and 6½ per cent hydrofluoric acid.

There was no agitation during the test. Temperatures ranged from 70° to 130°F. Contaminants in the acid bath included chromium, iron and salts along with a sludge of metallic oxides.

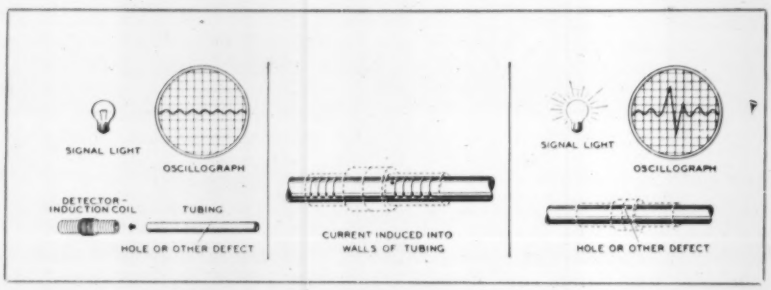
Results—After the exposure described above, test samples showed the following corrosion rate in inches penetration per month:

Type 316 . . . 0.0074 ipm.
Type 329 . . . 0.0009 ipm.

Translated, these results indicate that parts and equipment made from the 329 stainless might be expected to last eight times longer than those made from 316.

This alloy is the first metal shown to have commercial resistance to this extremely corrosive mixture. Separately the acids are relatively easy to handle.

electronic tester for tubular steel products detects tiny flaws in weld area or in walls. Pick-up sensitivity adjustable



THE ELECTRONIC method of testing tubular steel products (steel producers have used it for several years) was publicly unveiled at the recent National Exposition of Power and Mechanical Engineering in Philadelphia.

Developed by Cecil Farrow, one of Republic Steel's electrical engineers, the device can spot tiny holes, defects or irregularities in either welds or adjacent walls as tubes are passed through.

How It Works — Sound tubes, when passed through the induction coil detector, establish an even wave pattern on the oscillograph. The induced current flows evenly and smoothly around the circumference of the tubing. When a flaw is encountered, the current flow swerves around it and a peak is reflected on the oscillograph.

In production models, this signal is sent either to an alarm, signal light or directly to a device which marks the flaws. Sensitivity can be adjusted so that acceptable imperfections are ignored.

Farrowtesting first appeared on the industrial scene just in time to qualify welded steel tubing for aircraft use in World War II. The test method is now mandatory in Navy boiler tube specifications, and it plays a big role supplying sound pressure tubing for the automotive and refrigeration industries.

INTRICATE FORMING

Weirton hot-rolled strip steel is the ideal material for forming intricate shapes. It has all the qualities that define ductility, meaning the ability to perform well in tough draws, deep draws, draws into all kinds of intricate shapes. Next time your plans call for a steel strip capable of the most complicated forming—call Weirton and be sure.

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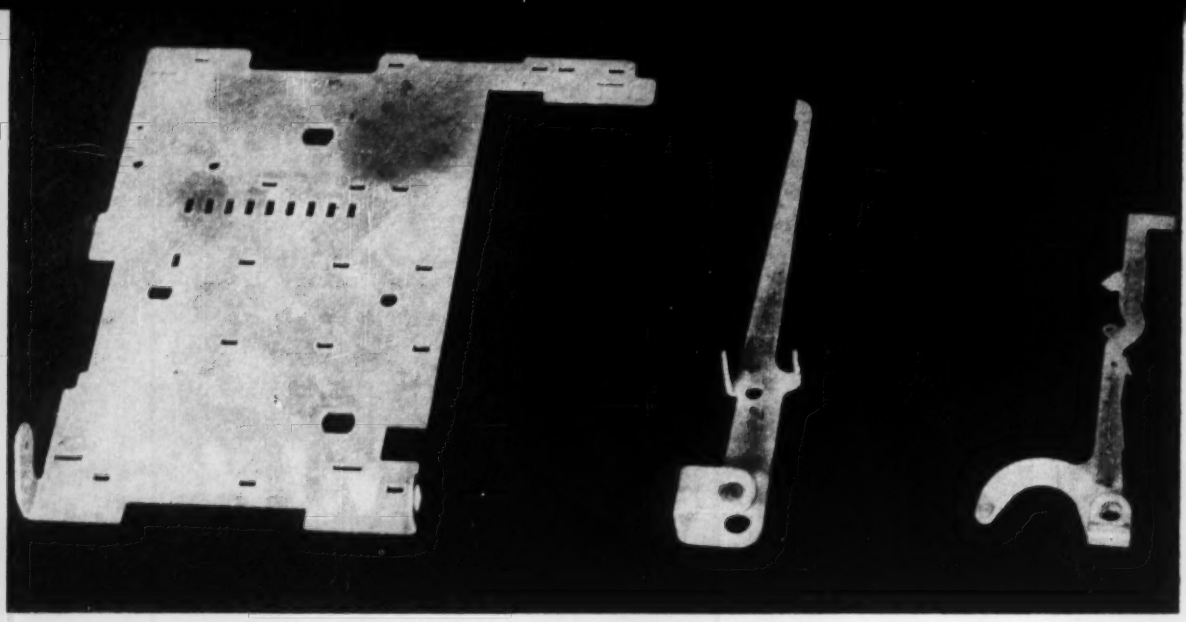
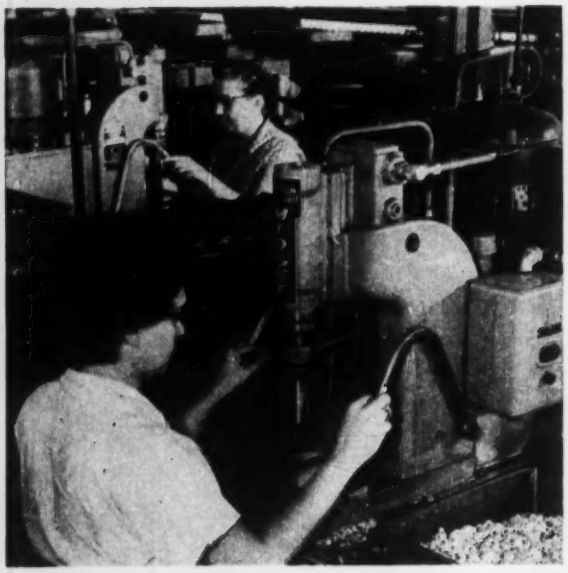


Here are some of the parts processed by Burroughs' presses. At left is the keyboard plate after straightening. At right are an adding detent and motor trip, each about ¼-in. wide at the widest point, after broaching and paralleling

Versatile Presses Form and Fit

Midget presses take precision fabrication and assembly in stride at Burroughs. On some jobs, they've upped the production rate as much as 20 per cent



Broach and parallel operation on a Midget press. Work is located on the plate toward the left, an insert spacer is mounted on the post at right, then swung into place inside the U. Bottom springs expose the broaching tool

OFFICE machinery manufacture poses some tough fabricating and assembly problems. A typical example is a new electric adding machine produced by Burroughs Corp.

The case is only 13 in. long, 8¼ in. wide and 7 in. high. It weighs 16 lb. Yet within the assembly there are 1500 parts. Of course, average weight is in fractions of ounces and dimensioning is held between tens of thousands of inches.

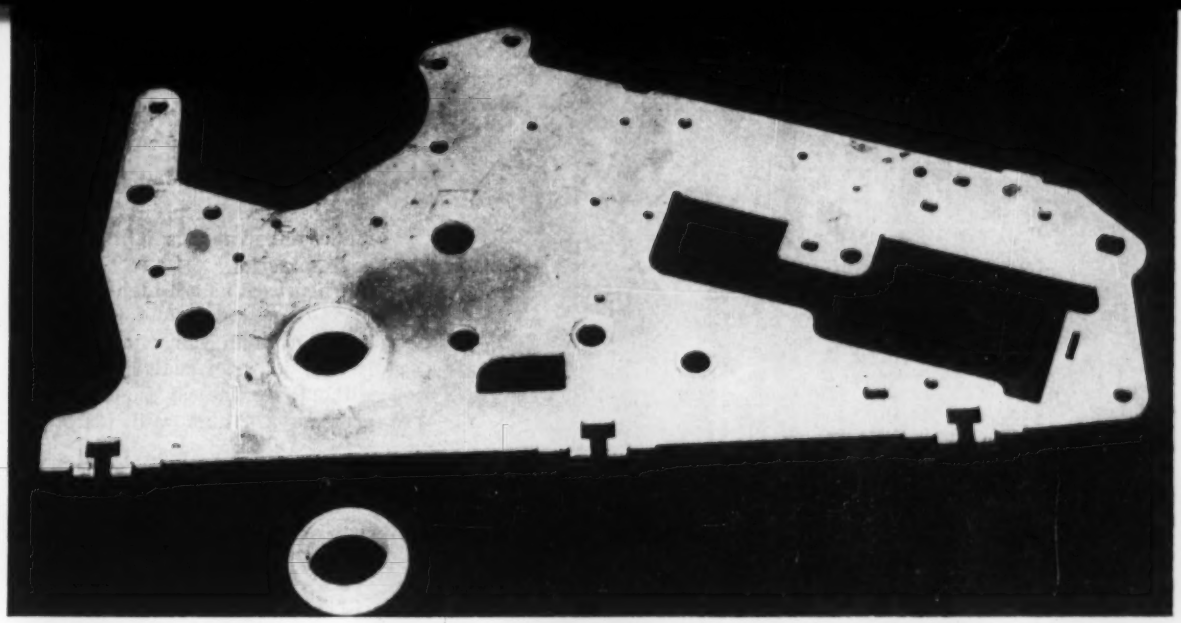
Eliminating Variation—Burroughs refined several phases of the sub-assembly production cycle with small multiduty presses. They increased output about 20 times on a variety of parts and eliminated human variation.

The presses are tooled for a variety of straightening, broaching and press-fitting jobs, and in each case the production speed—about 500 cycles an hour—shows to advantage when compared with speeds of 25 an hour on hand methods used earlier.

Straightening—Straightening involves the bottom keyboard plate of the Ten Key adding machine, a piece about 5 in. long. Material is plain carbon open hearth steel strip. Cold rolled, it is 0.040 in. thick ± 0.002-in. Rockwell hardness ranges from 55 to 70 B scale.

The plate is complicated by two small ears on opposite sides. These, plus the short length, have always made roll straightening impractical. They were straightened by hand-peening on an optically-flat plate, at a rate seldom exceeding 25 an hour.

Plates are fed into a Dennison Multipress that's usually equipped with rubber tile on the base and a block of maple wood on the ram. The 1-ton press pressure brings out pieces that are held well within the 0.003-in. engineering limit for straightness. The



This is the side frame with bearing housing press-fitted before riveting. The side frame steel plate is 0.050-in. thick. Location and strength of the housing are critical because there's considerable torque pressure and strain

Small Parts

100 per cent incentive rate is 500 pieces an hour, and operators can better this substantially. Usually, a run of 2000 to 3000 pieces is fed through the machine, then it's retooled for another part.

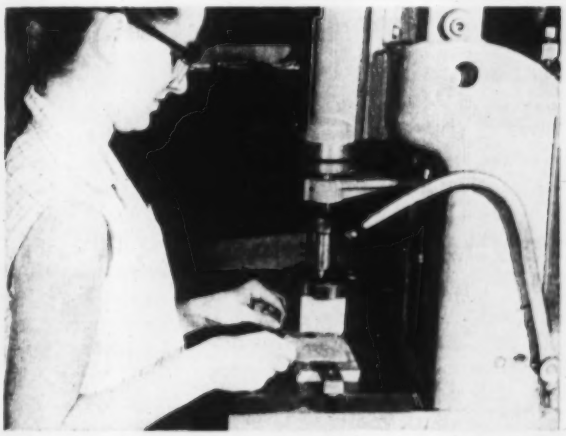
Sizing—Four other presses take components known as motor trips and adding detents, U-shaped at one end, for sizing and straightening. These are steel, with specs similar to that of the keyboard plate, except that the U-shaped member is 0.050-in. thick and cadmium plated. The operator lays the piece in place, then swings a spacer into position inside the U section.

One Multipress is used to press the bearing housing rim into a hole, and it takes all the machine's available pressure. Base output of 500 pieces an hour is upped significantly by good operators.

A spring-loaded plate on the press base, mounted with locating pins, is depressed by the ram. This exposes the sizing tool, which passes through the hole and brings it to dimension. Pressing action on the U sides bring the sides to within ± 0.001-in. from dimension.

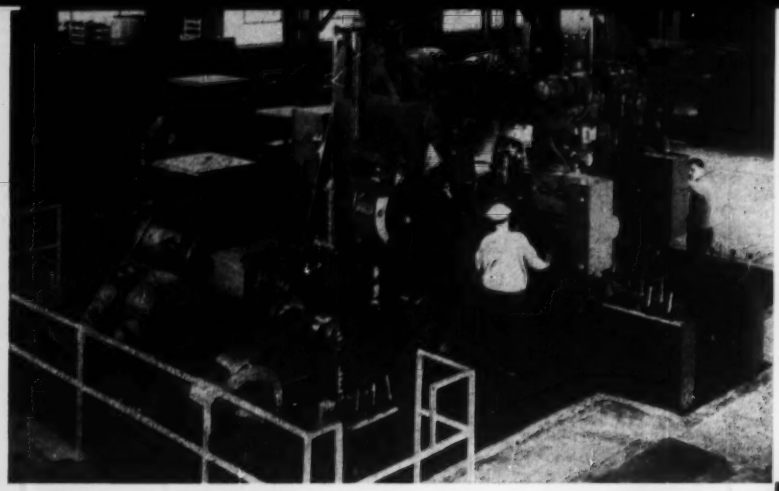
Press-Fitting—Another example of precision press work: Press-fitting of parts together to withstand any stress applied. This job is done on a side frame steel plate, 0.0625-in. thick. At one step in earlier processing, a hole about 1 in. in diameter is stamped out for a bearing housing. Location and strength of the housing itself are critical because there is considerable torque pressure and strain on both hole and shaft that is mounted in it.

Indicating the precision required for the fit is the fact that the piece is rejected if an 0.002-in. feeler can be inserted at any point around the circumference.



Typical straightening job. Burroughs finds it can tool for such work with a maple block of proper size mounted on the ram. At bottom are layers of rubber tile

Press-fitting of precisely-machined pieces like this side plate and bearing insert takes full capacity of the 1-ton press. It preassembles more than 500 pieces an hour

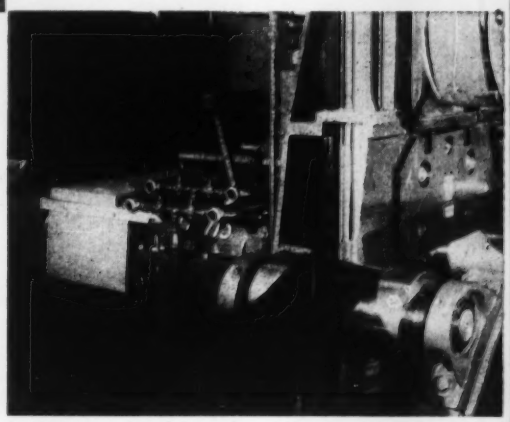


Follansbee's new 2-high, 4-high mill

Multipurpose Mill For Diverse Rolling

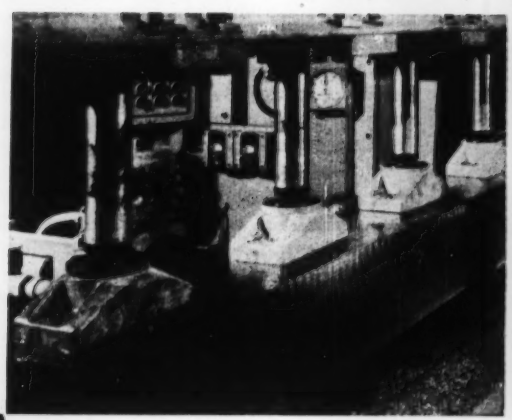
VERSATILE is the word for a combination 2-high, 4-high reversing mill recently installed at the Follansbee, W. Va., plant of Follansbee Steel Corp. It can both reduce and skin pass light or heavy gage material.

When used as a 4-high mill (using 4½ and 16 x 20 rolls) it has driven back-up rolls, with each roll having its own individual motor without mechanical tie-in. When used as a 2-high mill (21 x 18

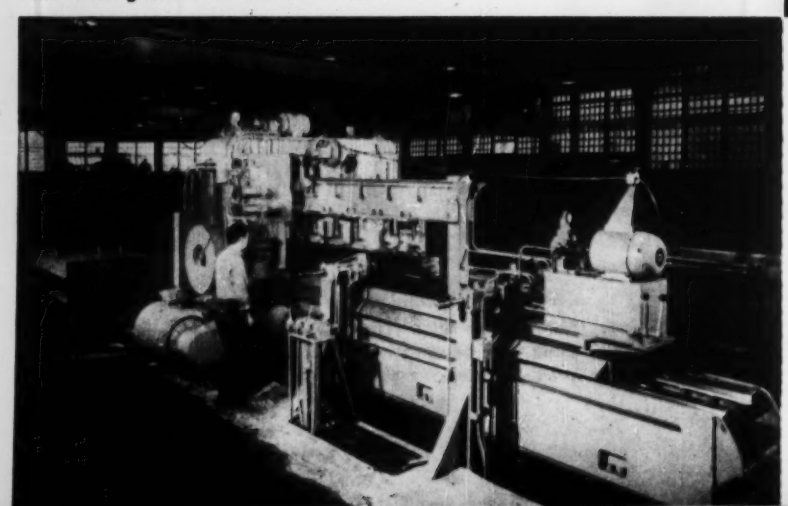


NEW MILL MACHINERY

Multipiece Milling Edges Flats in Stacks



Face milling stack of 32 steel flats



LATEST ADDITION to the Cold Finishing Department of Jones & Laughlin Steel Corp.'s Pittsburgh Works is a duplex milling machine that eliminates a bottleneck—finishing the edges of cold rolled flats.

Flats requiring processing range up to 2½ in. thick, 14⅞ in. wide and 12 ft long. The machine mills them in stacks, both edges of the stack at once.

Fast Cutting — Carbide-tipped cutters 15 in. in diameter do the

rolls) the same motors and drive are used.

For Re-roll—The mill can produce a large variety of re-roll products. Lewis Machinery Division of Blaw-Knox Co., Pittsburgh, designed it.

The company describes the mill as an ideal type where tonnage requirements do not justify separate mills for cold reducing, skin passing, tempering and gage correction.

* * * * * * * * * * *

job, operating at speeds up to 450 sfm. Table speed during rough cuts on medium carbon steel is 32 ipm, and for the finishing cut, about 17.5 ipm.

A hydraulic clamping fixture designed by J & L engineers holds the flats in place. J & L also designed the loading and unloading tables and the hydraulic work-positioning devices which align the flats on the clamping fixture prior to machining.

MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

STANDARD specifications for machine tools for airframe fabrication are on the way. Substantial progress was made at a meeting of the Aircraft Industries Association's machine tool panel and representatives of interested machine tool builders, in Washington, December 7 to 10.

Virtual agreement was reached on specifications for knee-type and bed-type milling machines and horizontal boring machines. Questions on some proposed specification details for skin and spar mills and profiling and contour mills still must be talked out.

Final specifications will be published as National Aircraft Standards. Other types of tools will be included as the full program is developed. Some time after January 1, the panel will begin work on specifications for forming machinery, such as stretch presses.

Objective — Specifications will be used to help individual airframe makers procure equipment of the best possible design for a job. Background for the standards comes from a study made by the aircraft industry on what their member companies required.

Standardization also will help to accomplish better interchangeability of tooling and production facilities. That means that in an emergency, a critical product could be produced in different areas, and could, if the need arises, be quickly set in production at any one of several different plants.

Discord — While the machine tool builders and the AIA are in hearty agreement that the standards should be written, they apparently don't see eye-to-eye on what should be included. Airframe makers may want to include such things as provisions for tape controls.

However, since no one knows today what tape controls will be like five years from now, it may be more realistic to put this type requirement on the list of items to be considered on an individual-machine basis.

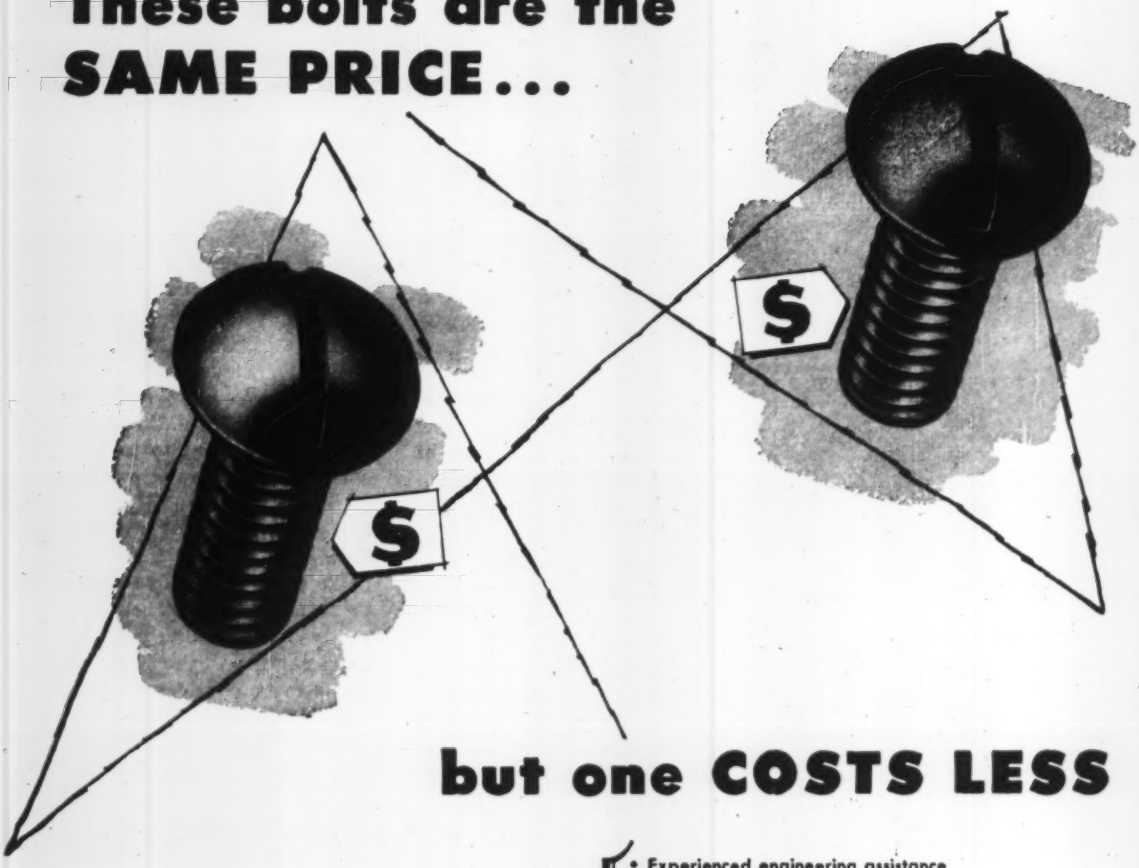
Third Party — The Air Force is interested in the specifications program since it will have direct application to the service's machine tool stockpiling program.

There's some chance of a double standard. The requirements for airframe builders don't all match those of the engine builders. The other possibility, of course, is that compromise standard specifications may be drawn up which would cover both areas of the aircraft industry.

Will Serve Air Force

Ralph E. Cross, executive vice president, Cross Co., Detroit, has accepted an appointment on a part-time basis as machine tool consultant to Roger Lewis, assistant secretary of the Air Force for Materiel. Mr. Cross previously served as director of the Metalworking Equipment Division, Business and Defense Services Administration. More recently, he has been the assistant administrator, BDSA.

These bolts are the SAME PRICE...



but one COSTS LESS

Granted that the price tag is the same on two bolts; how can one cost less?

The answer is obvious because no price tag tells the story behind the product. It doesn't show you the extra values that are as important as the price on the tag. By this reasoning, if you get *extra* value the product has, in effect, cost you less.

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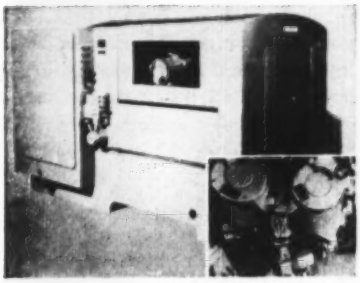
NEW PRODUCTS and equipment

Reply card on page 83 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue.

Automatic Wet-type Grinder for Gear Production



The No. 105 straight bevel Coniflex grinder, produces straight bevel gears up to 8½ in. pitch diameter, 1⅜ in. face width and 3 diametral pitch. All standard pressure angles can be ground. Work is done on the flat sides of two disc-type grinding wheels. The tooth profile shape is generated by a relative rolling motion between the gear blank and grinding wheels. There is continuous contact between the work and the wheels during the generation roll.

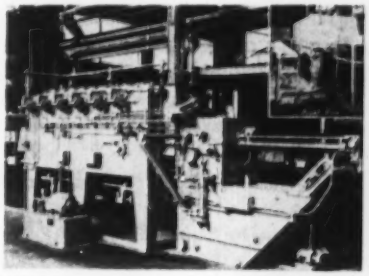
Hood guards cover the grinding area. A single lever controls the hydraulic guard door and chucking of the work. The automatic cycle drum and a variable stop set-in unit provide fast, flexible means for setting up the grinding cycle. Gleason Works.

FOR MORE DATA CIRCLE REPLY CARD NO. 1

Carbonitriding and Gas Carburizing Furnace

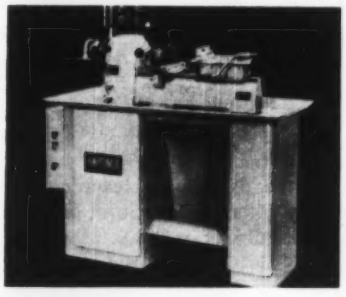
This gas-fired production furnace has a vertical radiant tube and a hydraulic pusher. It was designed to handle production loads of small parts requiring neutral hardening, carbonitriding, heavy and medium case gas carburizing and carbon restoration.

Twenty radiant tubes, 10 per zone, supply the heat. They are made of Inconel and suspended from the top plate. All are fired at the lower end and are easily removed from the top plate. Total input rating is 1,630,000 Btu per hr, 815,000 in each zone. Maximum rating is 1850° F. Hearth area of the furnace in the photo is 18 in. x 9 ft long. It will hold 12 baskets 18 in. x 9 ft x 5 in. Fully automatic generators are available. Lindberg Engineering Co.



FOR MORE DATA CIRCLE REPLY CARD NO. 2

Second Operation Machine with Instantly Variable Speeds



A touch of a button on the Model DSM59 changes the spindle speed instantly to any rate between 230 and 3500 rpm. A control box over the headstock allows the operator to increase or decrease speed to obtain efficient chip removal and surface finish. The machine does not have to be stopped to make spindle speed changes.

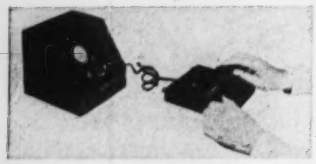
A lever operated ball bearing collet closer permits opening or closing a collet or step chuck while the machine operates; permits full range of collet tension from light to heavy hold power without the use of extra tools. Fitted with 5C round collet, it has a capacity of 1 1/16 in. A preloaded ball bearing turret head mounting eliminates all play between the turret head and turret slide. Hardinge Bros. Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 3

Marking Unit

. . . electrochemical

The etcher, using low current, makes a complete mark in a few seconds on medium to small round, flat or odd-shaped metal parts. The marking, which is permanent, is done with a chemically conductive fluid and the aid of electrical current passing through a marking fixture, which uses a stencil.



The illustration shows the portable marking unit. It connects to a standard ac 110 volt, 60 cycle line. It will mark materials from boron and tungsten carbides through stainless and tough alloy steels. No special skill is required to use it. Product Marking Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 4

Electroplating

. . . of cadmium

This bright cadmium process was designed especially to supply the demands for a deposit to meet definite thickness and corrosion protection specifications for iron and steel plating.

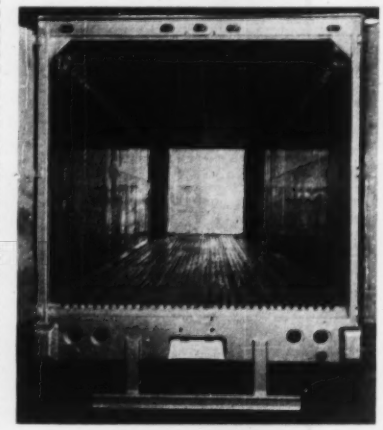
Use of their liquid brightener is said to permit easy control and allows complete and immediate integration with the solution. This, in turn, provides for an easier and faster method of handling additives. Frederic B. Stevens Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 5

Aluminum Floor

. . . interlocking joint

Aluminum boards, which fit any size refrigerated truck and trailer floor will prevent leakage to the insulation below, while providing for great strength and increased payload. The interlocking joint eliminates the need for screw holes through the top surface of the boards for fastening them to cross members. It is designed for lift truck loading up to 10,000 lb gross. The boards come in nine and 10-in. widths. By using combinations, the desired over-all width may be obtained.



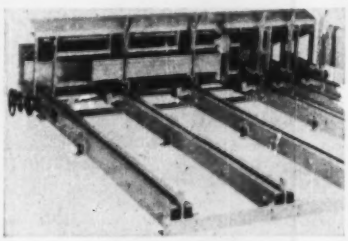
The light weight of the floor offers these advantages: Greater pay load, excellent drainage and ventilation, no waterlogging. The floor is readily cleaned with steam or proper solvents. Reynolds Metals Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 6

Materials Handling

. . . stacker, scrap eliminator

The Strip-Stacker and the Scrap-Eliminator used with the same line of strip and sheet handling equipment are said to synchronize cutting and handling. They allow a single operator to handle such jobs as the shearing operation, movement of the sheet or strip and discard of trims.



The Strip-Stacker receives cut material as it is delivered from the shear bed, stacks it neatly in dollies, then stores it aside. The Scrap Eliminator, with a teeter-table, allows the operator to reject scrap at a glance. In the photo, the stacker is in the foreground, the eliminator in the background. Fried Steel Equipment Mfg. Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 7

Drive Motor

. . . miniature

Powerful for its size (5½ oz), it is designed as a drive motor for switches, cams, servos and for similar applications. Model 1600-1 features a motor diameter of 1⅛ in. and measures 2-7/16 in. in length. Gear case diameter is 1½ in. and the mounting flange has a 2½ in. diameter.

The motor may be designed for any input voltage of 6 to 30 volts dc and any output speed from 4 to 10 rpm. Maximum torque load at 4 rpm is 50 in-oz, with a lower rating for higher speeds. It can be supplied with either leads or feed-through solder connections and governor control. The aluminum alloy case has a plastic molded brush housing. Ball bearings are sealed

and greased for the life of the motor. The armature assembly has been built to rigid specifications to insure long life and trouble-free operation. El Ray Motor Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 8

Pilot Controller

. . . thermostatic

Measuring 3 13/16 in. in width, it provides accurate temperature control of liquids or air when used with valves, dampers and other controls. It is readily employed in control systems of electroplat-

ing tanks, dying and bleaching machinery, chemical vats and processes, instantaneous water heaters, sewage disposal systems and other applications in which rapid response and adjustable control char-

acteristics are required.

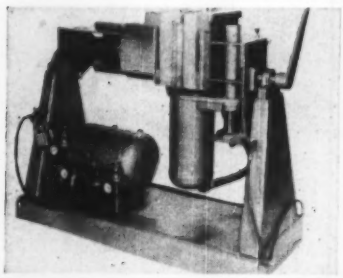
Fultrol pilot is installed where temperature is to be maintained. The rod-and-tube thermal element is immersed directly in the medium to be controlled. Any change in temperature at the thermal element activates a small pilot valve, which, in turn, varies the control pressure applied to a motor valve or any other final control device. The operation of the final control device governs the amount of cooling or heating applied. Fulton Sylphon Division, Robertshaw-Fulton Controls Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 9

Shell Core Blower

. . . choice of techniques

Similar to conventional core blowers in operation, it uses gravity-type investment or standard core-blowing techniques. The exception is that the core box is heated and phenolic resin is used instead of the conventional core binders.



Designed for use with conventional core boxes, model MC-5 accommodates core boxes of all sizes up to 9 x 12 in. in width and up to 20 in. in length. By the addition of longer heater plates, cores up to 30 in. in length can be produced. Standard wiring is for 220 or 440 volt 3-phase current. Heater plate temperature is thermostatically controlled to assure consistent, uniform core protection. Required air pressure is 90 psi. It will produce in shell form practically any core made by conventional methods. Shalco Engineering Corp.

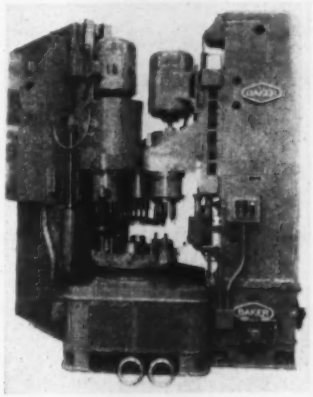
FOR MORE DATA CIRCLE REPLY CARD NO. 10

Special Machine

. . . performs 30 operations

That's what this machine does on differential ring gears for an automobile manufacturer. It spot drills to chamfer, drills and taps eight blind holes in steel. Features include an individual lead-screw tapper with magnetic clutch control. Estimated output per hour is 144 parts.

Model 26 HO used for drilling, is of twin pull cylinder construc-



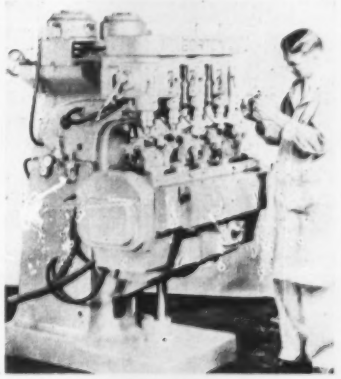
tion. In the photo sample parts can be seen at the front of the machine. Baker Bros. Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 11

Rotary Duplicator

. . . four spindle

The illustration shows two heads in operating position while the other two are idle during unloading, gaging and reloading. Design permits heads and rotating fixtures to operate in pairs, each



pair governed by a separate master within the table assembly. A pair of identical parts may be processed by one pair of cutters and fixtures, while another pair performs a different operation on two other pieces.

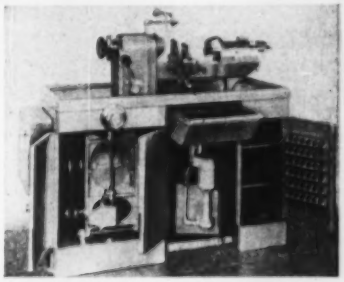
All movements are protected by electrical interlocks. Multiple spindle duplicators will profile (continuous or interrupted) internal or external surfaces, grooves and route piece parts at high production rate. George Gorton Machine Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 12

Hand Screw Machine

. . . no overheated motor

Continuous reversal of spindle direction can be made in this model 73 precision-built machine without a resulting motor problem. This is because the motor always runs in one direction. The gear box drive arrangement provides mechanical reversing. Helical gears in constant mesh, together with a clutch yoke and variable pitch drive pulley, are basic features of the gear box drive.



A positive drive timing belt replaces V-belts previously used. The variable pitch pulley on the motor shaft provides stepless speed control through a worm and worm gear operated by a handwheel. There is a 100 to 3500 rpm range. Wade Tool Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 13

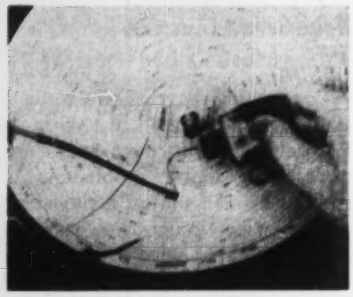
Recording Ink

. . . in squeeze bottle

For use with the company's industrial recording instruments, the Type 1500 ink was formulated for use with pens and Humitex charts to produce the sharpest possible record of a process variable. It is free-flowing and is quick-drying. Special properties give it a wide range of performance under varying industrial conditions. It is rated for high temperatures and can also be used down to 0° F.

It is furnished in a 1 oz polyethylene squeeze bottle. A plastic capillary tube and filter assembly enable the user to pinpoint a precise quantity of ink on the pen. Box pens can be tube-filled through the point and need no additional priming before

use. The bottle is quickly sealed for leakproof storage by inserting the tip of the filling tube into a receptacle in the closure. The ink



in the unbreakable plastic dispenser is furnished in red, violet, blue, green and black. Foxboro Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 14

Hydraulic Jack, Puller

. . . separate pumping unit

Designed for heavy duty jobs, the jack's hydraulic ram is raised and lowered by power. Travel is 10 in. The ram is equipped with Simplex Center-Hole that permits pulling without the use of backup devices. Connected to the pumping unit with a flexible hydraulic hose, the ram can be remotely located. The pump, which is powered by a ½ hp universal motor, may be operated by 115 v ac or dc. It can be started or stopped without losing travel of the ram.

The 60-ton Model RP798CO-6010 is available with a remote hydraulic hand pump. This model (RP7-6010)

features automatic two speed change-over on the pump. It raises the ram at high speed when positioning, then, when full power is needed, automatically shifts to low speed. Templeton, Kenly & Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 15

Barrel Finishing Compound

. . . for die casting

Honite is recommended for use on zinc, aluminum and other light metal alloy die castings. It will remove light machine marks and leave an extremely fine surface finish, avoiding deep scratches and exposure of porosity in castings. Stock removal is minimal.

The smoothness of the surface produced by the compound (a fine mineral grain gives it a mild abrasive action) improves the quality of subsequent plating and ball burnishing operations, according to the manufacturer. In-shop demonstrations may be arranged. Minnesota Mining & Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 16

Plastic Headshield

. . . for welding operators

Made of fiber glass reinforced plastic, they offer the user lightweight comfort coupled with head protection from welding arc and splatter. The plastic is durable, heat and moisture resistant, and its surface is easy to clean.

Type 971 has the lens holder molded right in the shield to eliminate light leaks and further reduce weight. Type 973 is of the same general design but has a lift front lens holder to permit the operator to view, chip and clean the weld without raising the hood. Both shields are equipped with Federal specifications lens. Hobart Bros. Co.

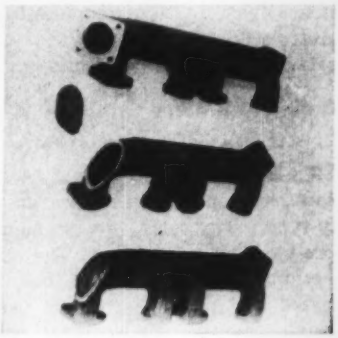
FOR MORE DATA CIRCLE REPLY CARD NO. 17

Electrode

. . . bi-metallic core

Designated as the 100-X, this electrode is available in ⅛, 5/32 and 3/16 in. sizes. Welders of average skill are able to get good bonding on steel and cast iron with the new rod. The deposit has a slight copper color and shows a tensile strength higher than cast iron. It is tough and ductile and highly resistant to shock. The deposit, which is free of cross checking, also can be peened. Current must be adjusted to suit the thickness of the work.

Scope of the electrode includes repair welding on all grades of iron castings, welding cast iron to carbon and alloy steels, welding heavy cast iron sections without studding and welding copper to cast



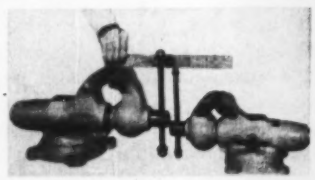
iron. Photo shows manifold prepared for welding. The rolled steel plate is welded in place to seal off exhaust outlet. C. E. Phillips & Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 18

Vises

. . . have many design changes

In the photo are the 1944 model (right) and the 1954 model (left). Both are 4½ in. vises. The current model incorporates major design changes which include a heavier swivel base, with 360 degrees rotation and an increased maximum jaw opening. Steel jaw inserts are



larger and deeper and have deeper serrations. Weights of all models have been increased and stronger materials are used. The handles have been equipped with rubber bumpers.

Nylon-tipped and vibration-proof screws are used for attaching jaw inserts and horseshoe retainer rings. Wilton Tool Mfg. Co. Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 19

FREE LITERATURE

Catalogs and Clip Sheets

Use these reply cards to bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue.

Armored Motors

General Electric Co. describes armored motors (direct current types, MD and MDP, 600 series) —Bulletin GEA-4654C, 4 pages.

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Magnet Wire

Anaconda Wire & Cable Co. has reduced its magnet wire catalog to pocket size—Catalog C-79-12A.

FOR A FREE COPY CIRCLE REPLY CARD NO. 21

Silver, Steel Saws

Atkins Saw Division, Borg-Warner Corp. presents information on silver and steel saws that sellers and buyers should know. A working catalog, it tells where, by whom and to what advantage the saws are used.

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Weighing Meters

Minneapolis-Honeywell Regulator Co. describes the Massometer (for flow-rate measurements of free-flowing solids) and Merchen Scale Meter (to provide continuous belt weighing of solids)—Data Sheet 11.5-3, 4 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 23

Sealed Journal Boxes

National Motor Bearing Co. Inc. offers "Instructions for Installing NMB Sealed Journal Box Kit in 5½ x 10 in. Integral Journal Box" —29 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 24

Milling Machines

Kearney & Trecker Corp. details its new knee type ram head (plain and universal) milling machines—Catalog No. RH-10, 11 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 25

Resistance Welding

Sciaky Bros., Inc. offers its machine catalog for electric resistance welding. It is in four sections: Industrial Applications; Manufacture and Service; Principles of Operation; Types of Electric Resistance Welding Machines. Bulletin No. 333, 12 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 26

Cab Air Conditioning

Lintern Corp. gives the whys and wherefores of crane cab air conditioning—Bulletin AC-549, 20 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 27

Valves, Fittings

Lunkenheimer Co. offers a comprehensive, illustrated circular describing Luncor, all molded PVC valves and fittings—4 pages.

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Plastic Coating

R. M. Hollingshead Corp. offers a basic technique manual for spraying Cocoon plastic coatings (a sprayable vinyl plastic consisting of a synthetic resin combination in volatile solvents).

FOR A FREE COPY CIRCLE REPLY CARD NO. 29

Fittings

Parker Appliance Co. describes the Lubrite finish, a permanent, black coating.

FOR A FREE COPY CIRCLE REPLY CARD NO. 30

Electric Equipment

Electric Equipment Co. offers its 1955 electric equipment catalog which lists partial supplies of transformers, motors, generators, platers, plating generator sets, compressors, rectifiers and regulators, circuit-breakers and oil switches—Catalog No. 54, 32 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 31

Small Parts Handling

Platers Research Corp. outlines ten modern methods of handling and cleaning small parts before barrel plating. Modern formulas

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for the make-up of bright nickel barrel plating solutions are described.

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Motors, Compressors

Gast Mfg. Corp. offers "Original Equipment Application Ideas for Product Designers." Solutions to 35 product component problems are given—Bulletin 1054-59, 11 pages.

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Powder Metallurgy

Amplex Division, Chrysler Corp. describes Steel Olite, which has high ductility, impact resistance and fatigue strength — Bulletin STM-54, 4 pages.

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Precision Machining

Connecticut Mechanical Industries Inc. gives case histories of routing, intricate and seemingly impossible special machining projects they have completed—17 pages.

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Lathes, Presses

Louis Levin & Son Inc. details a number of additions to its line of lathes, collets and micro-drill presses—Catalog M, 34 pages.

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Wax Cutting Fluids

S. C. Johnson & Son Inc.'s "Cutting and Grinding with Johnson's Wax Cutting Fluids" gives the advantages of wax in metalworking and the comparative machinability rating of different steel grades —13 pages.

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Cast Steel Sheaves

Farrell-Cheek Steel Co. details its improved carbon and alloy cast steel sheaves—4 pages.

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Grout, Mortar

Master Builders Co. describes its Embeco premixed mortar and Embeco premixed Grout—8 and 4 pages.

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Material Handling

Hyster Co.'s Field Report covers the profitable handling of precast concrete for bridges with use of RT-150 and YR-40 lift trucks —No. 52, 4 pages.

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Air Gages

Freeland Gauge Co. describes its air gage member restoration service—4 pages.

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Bobbin Core

Magnetics Inc. describes its standard line of performance-guaranteed tape wound bobbin cores—Bulletin BC-102, 4 pages.

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Aluminum Products

Kaiser Aluminum & Chemical Sales Inc. offers a wall chart listing an extensive line of new aluminum products in warehouse distributors' stocks.

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EDITORIAL REPRINTS:

Conversion Coating

Over-under construction utilizing a spray washer solved a short run coating problem for bulk ordnance parts. At G.E. the installation cuts handling to a minimum (p. 64).

FOR A FREE COPY CIRCLE REPLY CARD NO. 44

Short-cut Fabrication

Attempts by Blake Mfg. Div. of Ray-O-Vac Co. to draw a satisfactory steel case hit a snag. Thomas Strip Division of Pittsburgh Steel Co. came up with a special drawing quality steel with an electrolytic coating of copper. Fabrication steps are described on p. 60.

FOR A FREE COPY CIRCLE REPLY CARD NO. 45

Gas Brazing Aluminum

A semiautomatic setup used by Tricolator Co. is providing answers to many of their aluminum brazing problems. The gas-fired machine turns out one complete assembly every 80 seconds. All controls are automatic. The techniques are covered on p. 62.

FOR A FREE COPY CIRCLE REPLY CARD NO. 46

Blast Furnace Concepts

Present practice was built around raw materials with favorable characteristics. The author cautions that now is the time to prepare lower-grade operating data. On p. 68 is the last of the Blast Furnace Series.

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Market Outlook

IF 1954 offers a good sample of how we can handle our economic bumps, there's little to worry about in the future.

RESILIENT—This year demonstrated that steel demand can drop substantially without demoralizing the steel industry or triggering a collapse of industry as a whole. The output of steel for ingots and castings fell 21 per cent from that of last year, yet the steel industry remained sound and raised prices an average of $3 a ton or 2.5 per cent.

88-MILLION-TON YEAR—One of the reasons why the steel production decline was not felt more keenly is that 1954 is being compared with the record year of 1953. While 1954 dropped, it started down from such a high level that it could fall and still be respectable. When the final ton of the year is poured this week, the 1954 output of steel for ingots and castings will total about 88 million net tons, a figure which puts this year among the eight largest in history.

COASTED—The steel industry has built up so much strength that it can make a good production record with one hand tied behind it: It coasted into one of its eight largest years this year, using only 70.7 per cent of its capacity. It could use so little of its capacity and turn out so much steel because its capacity was larger than ever—124,330,410 net tons.

One of the things that moderated the effect of the decline in steel ingot production was the high level of steel consumption. It ran 14 per cent above output: Consumers drew from inventory.

SUSTAINED CONSUMPTION—Consumption of finished steel totaled around 73 million tons in 1954. This was only 9 per cent below 1953 mill shipments of finished steel, compared with a drop of 21 per cent in ingot output.

Even though 1954 was not a record year for the steel industry, it displayed something more healthful and encouraging than record 1953. After the first half, 1953 production went downhill. In contrast, 1954 ran along low but level in the first half and then went upward in the last half.

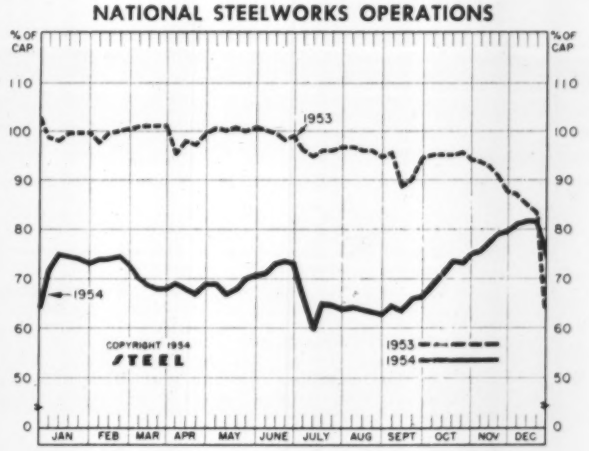
STABILIZER—Sensing that steel production was in only a temporary lull, steel industry executives avoided panic early this year and sustained their price structure. Some economic analysts say this solidity in steel pricing prevented a general demoralization of business. Deep price cuts would not have sold any more steel but would have weakened the public's confidence in the country's economy, these analysts contend.

Solidity in the steel market did not prevent competitive adjustments in pricing.

IN BETTER SPIRIT—The competitive spirit that has been resharpened in the steel industry will keep steel production from dropping as far this holiday season as it did a year ago. Now there's considerable business to be had, and each company is going after its share.

In the week ended Dec. 26, the national ingot production rate was 74.5 per cent of capacity, compared with 64 per cent in the comparable week of last year. A week ago the rate was 81.5 per cent.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Dec. 26	Change	Same Week 1953	Same Week 1952
Pittsburgh	68	10.5*	75.5	102
Chicago	82	5	74	106.5
Mid-Atlantic	67	8	71	95
Youngstown	70	17	60	106
Wheeling	62.5	23.5	68	98
Cleveland	91.5	4*	53	96
Buffalo	100	0	49	104
Birmingham	67	0	80	104
New England	70	0	76	89
Cincinnati	72	0.5	67.5	90
St. Louis	62.5	16.5	64	88.5
Detroit	75.5	0	67.5	104.5
Western	88	1	86	105
National Rate	74.5	7	64	103

INGOT PRODUCTION‡

	Week Ended Dec. 26	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	109.3†	121.4	119.2	89.9
NET TONS (In thousands)	1,756†	1,950	1,915	1,440

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

Metalworking Outlook—p. 19 Technical Outlook—p. 59

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Dec. 21 1954	Dec. 14 1954	Month Ago	Dec. Average
(1947-1949=100)	144.7	144.7	144.7	144.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Dec. 21

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.525
Rails, light, 40 lb	5.917
Tie Plates	5.275
Axles, railway	7.500
Wheels, freight car, 33 in. (per wheel)	48.500
Plates, carbon	4.675
Structural Shapes	4.517
Bars, tool steel, carbon (lb)	0.430
Bars, tool steel, alloy, oil hardening die (lb)	0.525
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.115
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.610
Bars, H.R., alloy	8.775
Bars, H.R., stainless, 303 (lb)	0.418
Bars, H.R., carbon	5.600
Bars, reinforcing	5.050
Bars, C.F., carbon	8.160
Bars, C.F., alloy	11.275
Bars, C.F., stainless, 302 (lb)	0.433
Sheets, H.R., carbon	4.880
Sheets, C.R., carbon	5.871
Sheets, galvanized	7.220
Sheets, C.R., stainless, 302 (lb)	0.549
Sheets, electrical	$9.350
Strip, C.R., carbon	7.507
Strip, C.R., stainless, 430 (lb)	0.415
Strip, H.R., carbon	5.125
Pipe, black, buttweld (100 ft)	15.000
Pipe, galv., buttweld (100 ft)	18.605
Pipe, line (100 ft)	146.804
Casing, oil well, carbon (100 ft)	154.216
Casing, oil well, alloy (100 ft)	227.875
Tubes, boiler (100 ft)	‡
Tubing, mechanical, carbon	‡
Tubing, mechanical, stainless, 304 (100 ft)	161.193
Tin plate, hot-dipped, 1.25 lb	8.533
Tin plate, electrolytic, 0.25 lb	7.233
Black plate, can making quality	6.333
Wire, drawn, carbon	7.938
Wire, drawn, stainless, 430 (lb)	0.545
Bale ties (bundle)	5.860
Nails, wire, 8d common	7.815
Wire, barbed (80-rod spool)	7.109
Woven wire fence (20-rod roll)	16.815

‡Not available.

STEEL's FINISHED STEEL PRICE INDEX*

	Dec. 22 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	194.53	194.53	194.53	189.74	156.88
Index in cents per lb.	5.270	5.270	5.270	5.140	4.250

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$117.95	$117.95	$117.95	$113.91	$92.18
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.22
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.72
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	32.50	32.42	33.08	31.33	26.83

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Dec. 22 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.30	4.15	3.45
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.35
Bars, H.R., deld. Philadelphia	4.55	4.55	4.55	5.302	3.93
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	3.95-4.00
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.40
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.25
Shapes, deld. Philadelphia	4.53	4.53	4.53	4.38	3.42
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.50
Plates, Chicago	4.225	4.225	4.225	4.10	3.40
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.35	3.60
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.50
Plates, Claymont, Del.	4.225	4.225	4.225	4.55	3.60
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.35
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Chicago	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.20
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pitts.	4.05	4.05	4.05	4.425	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45	4.00
Strip, C.R., Chicago	5.85	5.85	5.85	5.70	4.00-4.15
Strip, C.R., Detroit	5.90	5.90	5.90	5.45-6.05	4.20-.40
Wire, Basic, Pitts.	5.75	5.75	5.75	5.525	4.50
Nails, Wire, Pittsburgh	6.85	6.85	6.85	6.55	5.30
Tin plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.75

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$63.00
Wire rods, 5/32-9/16" Pitts.	4.675	4.675	4.675	4.525	3.85

PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	60.75	49.44
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, deld. Phila.	55.16	55.16	55.16	61.25	49.94
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38
No. 2 Fdry (Birm.) deld. Cin.	60.58	60.58	60.58	60.43	46.08
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$32.50	$32.50	$33.50	$32.50	$30.00
No. 1 Heavy Melt, E. Pa.	32.00	31.75	32.25	31.00	23.75
No. 1 Heavy Melt, Chicago	33.00	33.00	33.50	30.50	27.00
No. 1 Heavy Melt, Valley	34.50	34.50	34.50	29.50	30.25
No. 1 Heavy Melt, Cleve.	32.50	32.50	32.50	29.50	27.25
No. 1 Heavy Melt, Buffalo	30.50	30.50	31.50	29.50	29.75
Rails, Rerolling, Chicago	52.50	52.50	54.50	42.50	41.50
No. 1 Cast, Chicago	40.00	39.50	39.50	33.50	38.50

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$13.75	$13.75	$13.75	$14.75	$13.25
Beehive Fdry, Connlsvl.	16.75	16.75	16.75	16.75	15.50
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.00

Daily Nonferrous Price Record

	Price Dec. 22	Last Change	Previous Price	Nov. Avg.	Oct. Avg.	Dec. 1953 Avg.
Copper	30.00	Apr. 12	29.75-30.00	30.000	30.000	29.750
Lead	14.80	Oct. 4	14.55	14.800	14.775	13.300
Zinc	11.50	Sept. 3	11.00	11.500	11.500	10.000
Tin	87.50	Dec. 20	87.75	91.196	93.110	84.913
Nickel	64.50	Nov. 24, 1954	60.00	60.900	60.000	60.000
Aluminum	22.20	Aug. 5, 1954	21.50	22.200	22.200	21.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, common grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+ %, deld.; Magnesium 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

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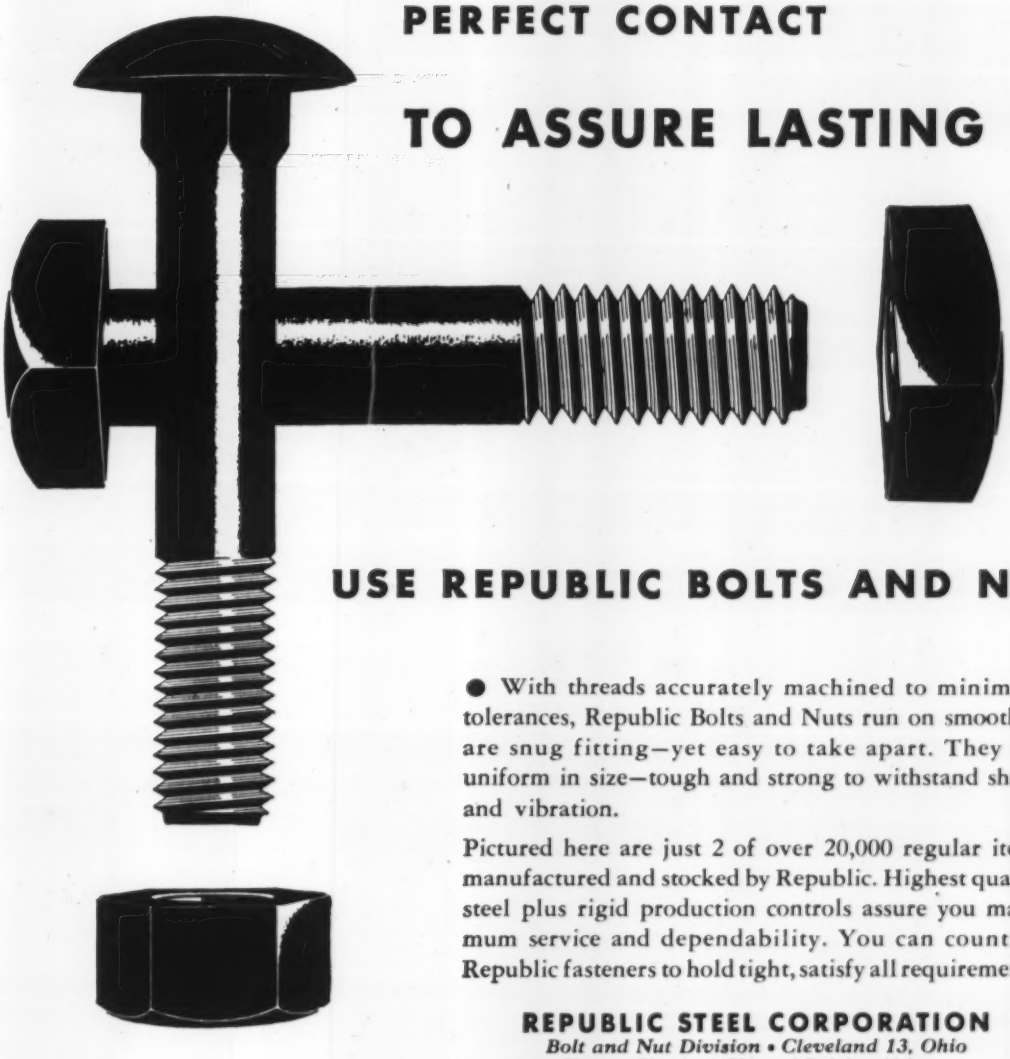

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REPUBLIC BOLTS AND NUTS

Nonferrous Metals

Cheerful predictions and sober reflections mark holiday season for metals men. Next year looks good for most, and 1954 wasn't as bad as many thought it would be

Nonferrous Metal Prices, Pages 90 & 91

SPECIAL significance is attached to the interlude between Christmas and New Year's by the business fraternity: It's the season for predictions.

Cheerful optimism for the prospects of the coming year is generally indicated, invariably so for the seer's own company. And nearly all contain the standard phrase "barring, of course, unforeseen circumstances." Yet these predictions come from men who know their field intimately, and in total they present a good perspective on what to expect. For an idea of how nonferrous metals will fare in 1955, here's a sampling:

Aluminum: "The market outlook for 1955 is good, and long-range potentials are most encouraging. The rate of aluminum shipments for civilian use in 1954 was even higher than in boom-year 1953. . . Alcoa's production in primary aluminum in 1954 is expected to be about 665,000 tons, despite the curtailment of electrolytic smelting operations in the Southeast due to low water conditions.

"The past year has been notable for advances in the development of aluminum alloys, processes and finishes. Market gains have again been made in building products, transportation, electrical conductor, packaging and in many other directions."—I. W. Wilson, president, Aluminum Co. of America.

Brass: "Although the quantity of brass consumed in the United States in 1954 was roughly 20 per cent below the tonnage of the previous year, the changeover from mass production of comparatively simple forms for defense use to the more specialized customer requirements from American industry has brought a compensatory balance in the dollar return to the brass mill.

"Steady progress in the means and speed of deliveries has swung the emphasis from maintenance of inventories to reliance on the pipeline between the start and the finish of the industrial process. On first thought this would seem to mean that the primary producer is forced to 'hold the bag.' In actual fact the change in emphasis works to the competitive advantage of the efficient operator who is geared to meet the early delivery dates expected by customers."—L. P. Sperry, president, Scovill Mfg. Co.

Copper: "Even though consumption of refined copper this year is estimated to be about 15 per cent less than last year, 1954 will be considered a fairly high year. Reduction experienced during this year was due to reduced military purchasing, inventory liquidation by durable goods manufacturers and changeover in models for the automobile industry.

"As 1955 approaches, the estimated new record year of construction activity, accompanied by increases in new orders for durable goods manufacturers and stabilized military procurement, will bring about a high level of production in the copper fabricating industry." Glenn G. Haycraft, Copper Division, BDSA.

Nickel: "Nickel production by the free world in 1954 will reach an all-time high estimated at 390 million lb or about 50 per cent higher than the pre-Korean 1949 output. The 1954 production is 50 million lb higher than the free-world output in 1953.

"Free-world nickel production in 1955 should approximate 415 million lb. After satisfying defense requirements and deliveries to government stockpiles under present schedules, more nickel will be available for civilian applications in 1955 than was the case in 1954."—John F. Thompson, chairman, International Nickel Co.

Zinc: "The zinc industry will be on a more stable basis during 1955 than at any time since the outbreak of the Korean conflict.. Contributing toward a more stable price structure during 1955 is the anticipation that heavy imports will be reduced as foreign consumption of slab zinc improves.

"The outlook is for zinc sales in 1955 to be at least equal to and probably somewhat better than in 1954; there should be considerably improved demand for those products that go into highway construction—mainly zinc covered sheets, mine by-products and stone. Agricultural purchases of zinc-coated sheets and wire will be greater in 1955."—Howard I. Young, president, American Zinc, Lead & Smelting Co.

Seconday Metals: "Consumers and dealers do not appear to have excessive inventories on hand. There is demand for every type of nonferrous scrap. Prices being paid by domestic consumers equal or exceed the export prices on most grades of nonferrous metals. Therefore, export of most nonferrous scrap has been dropping each month for the past several months."—Herman J. Galamba, Sonken-Galamba Corp., president, Secondary Metal Institute, National Association of Waste Material Dealers.

Scrap: "During most of 1954 there was a lull in domestic consumption, (although) terrific demand during the latter part of the year resulted in severe shortage of certain grades of nonferrous metals. Availability of export orders in the Orient, Europe and India took up the slack when the domestic consumers did not wish to purchase due to the lack of interest in their finished ingots and other smelters' items. Copper led the metals again, being in demand by both domestic and foreign consumers at all times.

"Brass mills are accepting all grades of scrap and often are paying small premiums for good quality material. Aluminum was the least fluctuating metal. Fabricators were keen purchasers of selected grades of scrap, particularly the wrought alloys in clip and other solid forms. The outlook for 1955 looks bright."—Joseph Roth, Roth Bros. Metal Co. Inc., president, Metal Dealers Division, National Waste Dealers.

Copper-base Products: Off to a Good Start in 1955

(Deliveries in millions of lb—metal weight)	1955	1954				
	1st Qtr.*	1st Qtr.	2nd Qtr.†	3rd Qtr.*	4th Qtr.*	1954 Total*
Brass Mill Products	580	544	527	482	580	2,133
Unalloyed	200	177	198	187	210	772
Alloyed	380	367	329	295	370	1,361
Wire mill products (copper content)	340	307	312	300	350	1,269
Foundry and powder mill products	227	218	224	203	233	878

†Preliminary. *Estimated. U.S. Department of Commerce.

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- Visual and Audible Signal Devices

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SIC NO.	AND DESCRIPTION	Total	Copies in Company Name	Corporate Officials and Gen. Mgrs.	Mfg., Production and Processing Mgrs. and Supts.	Engineering Dept. Heads and Design and Plant Engineers	Purchasing, Sales and other Personnel
10-14	Mines	522		44	404	74	
20	Food and Kindred Products	1340	6	210	203	917	4
21	Tobacco Manufacturers	62		10	9	43	
22	Textile Mill Products	965		203	97	664	1
24	Lumber and Wood Products	403		112	66	225	
25	Furniture and Fixtures	181		44	42	95	
26	Paper and Allied Products	734	1	98	126	508	1
27	Printing, Publishing and Allied Industries	179		14	28	134	3
28	Chemicals & Allied Products	1348	9	173	281	884	1
29	Petroleum & Coal Products	427		27	68	332	
30	Rubber Products	211		20	34	157	
31	Leather & Leather Products	213		37	26	150	
32	Stone, Clay & Glass Products	765	1	78	157	529	
33	Primary Metal Industries	1482	6	479	447	545	5
34	Fabricated Metal Products	1547		522	350	672	3
35	Machinery, except Electrical	5187	12	1657	843	2625	50
36	Electrical Machinery, Equipment & Supplies	1950	12	471	381	1056	30
37	Transportation Equipment	1732	26	379	524	791	12
38	Instruments, Optical Goods, Watches & Clocks	605	6	154	116	321	8
39	Miscellaneous Manufacturing Industries	227		41	41	143	2
89	Consulting & Industrial Engineering Firms	937	4	624	6	290	13
	Miscellaneous Industries including Ordnance, Banks, Insurance Companies, Educational, Trade Associations, Libraries, etc.	40	13	9	2	7	9
	TOTAL	21057	96	5406	4251	11162	142
	PERCENTAGE	100.00	0.46	25.67	20.19	53.00	0.68

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Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 23.20, pigs 20.50 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 24; No. 43, 5% Si, 23.8; No. 142, 4% Cu, 25.1; No. 195, 4.5% Cu, 0.8% Si, 24.5; No. 214, 3.8% Mg, 25.2; No. 356, 7% Si, 0.3% Mg, 23.9.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.; Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 deld. Conn. Valley, 30.00 deld. Midwest; Lake 30.00 deld.; Fire refined 29.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $110-$120 nom. per troy oz.

Lead: Common 14.80, chemical 14.90, corroding 14.90, St. Louis; N. Y. basis, add 0.20.

Lithium: 98%, $10-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks 1.5 in. diameter, 46.00, 100 to 4999 lb f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J

Mercury: Open market, spot, New York, $315-$320, per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 64.50; 10-lb pigs, unpacked 67.65; "XX" nickel shot 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty, New York basis, add 0.92.

Osmium: $120-$130 nom. per troy oz.

Palladium: $18-$20 per troy oz.

Platinum: $81-$84 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $120-$125 per troy oz.

Ruthenium: $50-$55 per troy oz.

Selenium: 99.5%, $5-$6 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 87.50, prompt 87.50.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max) $4.50, grade A-2 (0.5% Fe max) $4 per pound.

Tungsten: Powder, 98.5%, carbon reduced, 1000 lb lots $4.95 per lb nom., f.o.b. shipping point; less than 1000 lb $5.10 nom.; 99+% hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.50, brass special 11.75, intermediate 12.00, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.85, special high grade 13.00, die casting alloy ingot 15.50, deld.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloy 21.25-22.25; No. 12 foundry alloy (No. 2 grade) 20.75-21.25; 5% silicon alloy, 0.60 Cu max., 23.50-23.75; 13 alloy 0.60 Cu max., 23.50-23.75; 195 alloy 22.00-23.50; 108 alloy 21.75-22.00; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 21.75-22.50; grade 2, 20.75-21.75; grade 3, 20.25-20.50; grade 4, 19.25-19.75.

Brass Ingot: Red brass, No. 115, 30.00; tin bronze No. 225, 41.00; No. 245, 34.75; high-leaded tin bronze, No. 305, 34.00; No. 1 yellow, No. 405, 25.75; manganese bronze No. 421, 27.75

Magnesium Alloy Ingot: AZ63A, 31.00; AZ91B, 26.00; AZ91C, 31.00; AZ92A, 31.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy.) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l. 37.03. Magnet wire deld., 15,000 lb or more 41.83; l.c.l 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $20.00 per cwt; pipe, full coils $20.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets $9; hot-rolled and forged bars, $9.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	125
Plate, H.R.	97	82	95
Rod, Shapes H.R.	87	69	93
Rod, Shapes C.R.	91	75	115
Seamless Tubes	122	108	153
Shot, Blocks		65	

ALUMINUM*

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	62.5	61.0	...	...
0.156-0.172	52.9	51.3	...	...
0.188	52.9	51.3	...	65.8
0.219-0.234	50.1	48.5	...	...
0.250-0.281	50.1	48.5	...	62.7
0.313	50.1	48.5	...	59.8
Cold-finished				
0.375-0.547	48.9	46.5	53.8	56.2
0.563-0.688	48.9	46.5	55.9	52.7
0.750-1.000	47.7	45.3	51.1	49.6
1.063	47.7	45.3	...	47.9
1.125-1.500	45.9	43.6	49.4	47.9
Rolled				
1.563	44.7	42.4	...	...
1.625-2.000	44.1	41.8	...	46.2
2.125-2.500	43.0	40.7	...	...
2.563-3.375	41.7	39.5	...	...

ALUMINUM*

Sheets and Circles: 1100 and 3003 mill finish c.l. (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	34.9	...	...
0.135-0.096	12-48	35.4	...	...
0.095-0.077	12-48	36.1	33.6	38.8
0.076-0.061	12-48	36.7	33.8	38.8
0.060-0.048	12-48	37.2	34.1	39.2
0.047-0.038	12-48	37.7	34.6	39.6
0.037-0.030	12-48	38.1	35.0	40.3
0.029-0.024	12-48	38.7	35.3	40.8
0.023-0.019	12-36	39.4	36.1	41.6
0.018-0.017	12-36	40.2	36.7	42.5
0.016-0.015	12-36	41.1	37.5	43.7
0.014	12-24	42.1	38.5	45.0
0.013-0.012	12-24	43.3	39.2	46.0
0.011	12-24	44.3	40.4	47.6
0.010-0.0095	12-24	45.5	41.5	49.2
0.009-0.0085	12-24	46.8	43.0	51.2
0.008-0.0075	12-24	48.4	44.2	53.1
0.007	12-18	49.9	45.7	55.4
0.006	12-18	51.5	47.1	60.4

*72-180 in. lengths. †26 in. max. dia.

ALUMINUM*

Plates and Circles: Thickness 0.250-3.0 in 24-60 in. width or dia, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	34.7	38.9
5050-F	34.7	38.9
3004-F	35.7	40.6
5052-F	37.4	42.4
6061-T6	38.6	43.0
2024-T4*	40.8	46.9
7075-T6*	48.6	55.2

*24-48 in. widths or dia., 72-180 in. lengths

ALUMINUM*

Forging Stock: Round, Class 1, 46.8-36.3 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 52.6-40 in. random lengths 0.375-4.0 in. thick widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¼	$515.70	2	$ 48.30
1	24.75	4	132.90
1¼	23.50	6	238.35
1½	40.05	8	358.60

*Alloy designations are standard for use on and after Oct. 1, 1954. To relate them to designations used prior to that time, see STEEL Aug. 9, 1954, p. 95.

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¾ x 2 in 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in 62.50. Tubing, 1 in. OD x 0.065-in. 87.00 Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in 67.00. Channels, 5 in. 67.80. I-Beams, 5 in 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 28 clippings 14.50; low copper clippings 14.50; mixed clippings 12.50; old sheet 11.00; borings and turnings 7.50; pistons and struts 8.00; crankcases 11.00; industrial castings 11.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f	
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.76b	46.36c	....	48.82	26.000	26.000	25.250
Yellow Brass	42.27	42.21d	42.81	45.18	19.875	19.625	18.250
Red Brass, 85%	45.89	45.83	46.43	48.70	23.000	22.750	22.250
Low Brass, 80%	44.95	44.89	45.49	47.76	22.250	22.000	21.500
Naval Brass	46.39	40.70	53.43	49.55	18.500	18.250	17.750
Commercial Bronze, 90%	47.38	47.32	47.92	49.94	23.875	23.625	23.125
Nickel Silver, 10%	56.30	60.68g	58.63	....	24.125	23.875	12.063
Phosphor Bronze, A, 5%	67.31	67.81	67.81	68.96	26.500	26.250	25.250
Silicon Bronze	53.09	52.28	53.13	70.49e	25.125	24.875	24.125
Manganese Bronze	50.09	44.25	54.70	....	18.500	18.250	17.750
Muntz Metal	44.54	40.35	....	....	18.750	18.500	18.000

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: Heavy copper and wire No. 1 26.00-26.50; No. 2 copper 24.50-25.00; light copper 22.50-23.00; No. 1 composition red brass 21.00; No. 1 composition turnings 20.50; mixed brass turnings 14.00; new brass clippings 18.00; No. 1 brass rod turnings 15.00; light brass 12.50; heavy yellow brass 15.50; new brass rod ends 16.00; auto radiators, unsweated 17.00; cocks and faucets 17.00; brass pipe 17.50.

Lead: Heavy 11.75-12.00; battery plate 6.25-6.50; linotype and stereotype 13.75-14.00; electrotype 12.00-12.50; mixed babbitt 12.50-13.00.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 15.50-16.50.

Monel: Clippings 23.00-25.00; old sheet 21.00-23.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 50.00.

Zinc: Old zinc, 5.00-5.25; new die cast scrap, 4.75-5.00; old die cast scrap, 3.25-3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 15.75-16.00; 51S, 52S clippings 15.75-16.00; 14S, 17S, 24S clippings 15.00-15.25; mixed clippings 14.50-14.75; old sheet 13.75-14.00; old cast 13.75-14.00; clean old cable, free of steel 15.75-16.00; borings and turnings 14.00-14.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 28.50; No. 2 copper 27.00; light copper 25.50; refinery brass (60% copper) per dry copper content 25.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 28.50; No. 2 copper 27.00; light copper 25.50; No. 1 composition borings 23.25; No. 1 composition solids 23.50; heavy yellow brass solids 18.00-18.25 yellow brass turnings 17.00-17.25; radiators 19.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 5000-10,000 lb; electrodeposited 39.78, cast 42.04, 2000-5000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.085; 200-499 lb $1.07; 500-999 lb $1.065; 1000 lb or more $1.06.

Zinc: Bar 20.00, bar or flat top 19.00 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 69.6; 100-600 lb 55.4; 700-1900 lb 53; 2000-9900 lb 51.2; 10,000 lb or more 50.1.

Stannous Chloride (Anhydrous): Less than 50 lb $1.551; 50 lb $1.211; 100-300 lb $1.061; 400-900 lb $1.037; 100-1900 lb $1.013; 2000-4900 lb 97.6; 5000-19,000 lb 91.5; 20,000 lb and over 85.4.

Stannous Sulphate: Less than 5 lb $1.252; 50 lb 95.2; 100-1900 lb 93.2; 2000 lb and over 91.2.

Zinc Cyanide: Under 1000 lb 54.30; 1000 lb and over 52.30.

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Single and double-truck to any desired capacity

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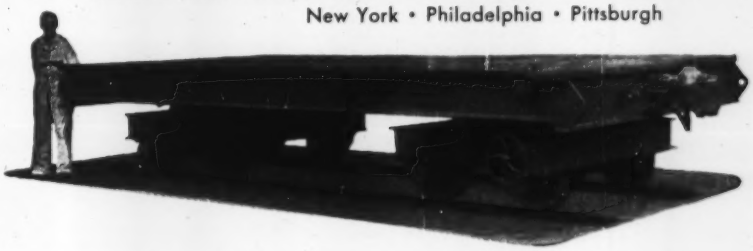
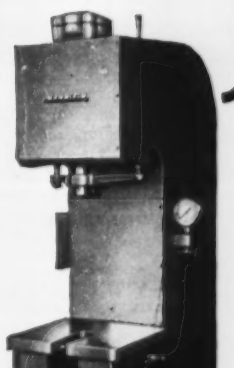


PRICE LIST

ON HANNIFIN STOCK HYDRAULIC PRESSES



1-TON	$ 552
2-TON	$ 627
5-TON	$1,286
8-TON	$1,581
10-TON	$1,855
25-TON	$3,681

Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.

DELIVERY FROM STOCK

Demand for these popular presses is so consistent we are able to produce them in quantity and pass the savings along to you.

Construction-wise and quality-wise these small general-purpose presses are identical to the larger Hannifin presses, up to 150 tons. Special, optional controls when needed.

WRITE for complete information on the Hannifin Hydraulic Press you're interested in.

HANNIFIN

HANNIFIN CORPORATION, 523 S. WOLF ROAD, DES PLAINES, ILLINOIS

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; Key on page 93. Key to footnotes, page 95.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $61.50

INGOTS, Alloy (NT)

Detroit R7 ..... $65.00
Houston S5 ..... 73.00
Midland,Pa. C18 ..... 65.00
Munhall,Pa. U5 ..... 65.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ..... $64.00
Bessemer,Pa. U5 ..... 64.00
Buffalo R2 ..... 64.00
Clairton,Pa. U5 ..... 64.00
Ensley,Ala. T2 ..... 64.00
Fairfield,Ala. T2 ..... 64.00
Fontana,Calif. K1 ..... 72.00
Gary,Ind. U5 ..... 64.00
Johnstown,Pa. B2 ..... 64.00
Lackawanna,N.Y. B2 ..... 64.00
Munhall,Pa. U5 ..... 64.00
Pittsburgh J5 ..... 64.00
So.Chicago,Ill. R2, U5 ..... 64.00
So.Duquesne,Pa. U5 ..... 64.00
Youngstown R2 ..... 64.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ..... $78.00
Bessemer,Pa. U5 ..... 78.00
Buffalo R2 ..... 78.00
Canton,O. R2 ..... 80.00
Clairton,Pa. U5 ..... 78.00
Conshohocken,Pa. A3 ..... 83.00
Ensley,Ala. T2 ..... 78.00
Fairfield,Ala. T2 ..... 78.00
Fontana,Calif. K1 ..... 86.00
Gary,Ind. U5 ..... 78.00
Geneva,Utah C11 ..... 78.00
Houston S5 ..... 85.00
Johnstown,Pa. B2 ..... 78.00
Lackawanna,N.Y. B2 ..... 78.00
LosAngeles B3 ..... 87.50
Munhall,Pa. U5 ..... 78.00
Pittsburgh J5 ..... 78.00
Seattle B3 ..... 91.50
So.Chicago R2,U5,W14 ..... 78.00
So.Duquesne,Pa. U5 ..... 78.00
So.SanFrancisco B3 ..... 87.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..... $86.00
Buffalo R2 ..... 86.00
Canton,O. R2, T7 ..... 86.00
Conshohocken,Pa. A3 ..... 93.00
Detroit R7 ..... 86.00
Fontana,Calif. K1 ..... 105.00
Gary,Ind. U5 ..... 86.00
Houston S5 ..... 93.00
Ind.Harbor,Ind. Y1 ..... 86.00
Johnstown,Pa. B2 ..... 86.00
Lackawanna,N.Y. B2 ..... 86.00
LosAngeles B3 ..... 106.00
Massillon,O. R2 ..... 86.00
Midland,Pa. C18 ..... 86.00
Munhall,Pa. U5 ..... 86.00
So.Chicago, R2,U5,W14 ..... 86.00
So.Duquesne,Pa. U5 ..... 86.00
Struthers,O. Y1 ..... 86.00
Warren,O. C17 ..... 86.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ..... $96.50
Canton,O. R2 ..... 96.50
Cleveland R2 ..... 96.50
Gary,Ind. U5 ..... 96.50
So.Chicago R2, W14 ..... 96.50
So.Duquesne,Pa. U5 ..... 96.50

SKELP

Aliquippa,Pa. J5 ..... 4.00
Fontana,Calif. K1 ..... 4.775
Munhall,Pa. U5 ..... 3.90
Warren,O. R2 ..... 3.90
Youngstown R2, U5 ..... 3.90

WIRE RODS

AlabamaCity,Ala. R2 ..... 4.675
Aliquippa,Pa. J5 ..... 4.675
Alton,Ill. L1 ..... 4.85
Buffalo B11, W12 ..... 4.675
Cleveland A7 ..... 4.675
Donora,Pa. A7 ..... 4.675
Fairfield,Ala. T2 ..... 4.675
Fontana,Calif. K1 ..... 5.475
Houston S5 ..... 5.075
IndianaHarbor,Ind. Y1 ..... 4.675
Johnstown,Pa. B2 ..... 4.675
Joliet,Ill. A7 ..... 4.675
KansasCity,Mo. S5 ..... 5.015
Kokomo,Ind. C16 ..... 4.775
LosAngeles B3 ..... 5.475
Minnequa,Colo. C10 ..... 4.925
Monessen,Pa. P7 ..... 4.675
No.Tonawanda,N.Y. B11 ..... 4.675
Pittsburg,Calif. C11 ..... 5.325
Portsmouth P12 ..... 4.675
Roebling,N.J. R6 ..... 4.775
So.Chicago,Ill. R2 ..... 4.675
Sterling,Ill.(1) N15 ..... 4.675
Sterling,Ill. N15 ..... 4.775
SparrowsPoint,Md. B2 ..... 4.775
Struthers,O. Y1 ..... 4.675
Torrance,Calif. C11 ..... 5.475
Worcester,Mass. A7 ..... 4.975

STRUCTURALS

Carbon Steel Stand. Shapes

Ala.City,Ala. R2 ..... 4.25
Aliquippa,Pa. J5 ..... 4.25
Bessemer,Ala. T2 ..... 4.25
Bethlehem,Pa. B2 ..... 4.30
Birmingham C15 ..... 4.25
Clairton,Pa. U5 ..... 4.25
Fairfield,Ala. T2 ..... 4.25
Fontana,Calif. K1 ..... 4.90
Gary,Ind. U5 ..... 4.25
Geneva,Utah C11 ..... 4.25
Houston S5 ..... 4.65
Ind.Harbor,Ind. I-2 ..... 4.25
Johnstown,Pa. B2 ..... 4.30
KansasCity,Mo. S5 ..... 4.85
Lackawanna,N.Y. B2 ..... 4.30
LosAngeles B3 ..... 4.95
Minnequa,Colo. C10 ..... 4.70
Munhall,Pa. U5 ..... 4.25
Niles,Calif. P1 ..... 4.90
Phoenixville,Pa. P4 ..... 3.95
Portland,Oreg. O4 ..... 5.00
Seattle B3 ..... 5.00
So.Chicago U5, W14 ..... 4.25
So.SanFrancisco B3 ..... 4.90
Torrance,Calif. C11 ..... 4.95
Weirton,W.Va. W6 ..... 4.25

Wide Flange

Bethlehem,Pa. B2 ..... 4.30
Clairton,Pa. U5 ..... 4.25
Fontana,Calif. K1 ..... 5.25
Lackawanna,N.Y. B2 ..... 4.30
Munhall,Pa. U5 ..... 4.25
Phoenixville,Pa. P4 ..... 3.95
So.Chicago,Ill. U5 ..... 4.25

Alloy Stand. Shapes

Clairton,Pa. U5 ..... 5.20
Fontana,Calif. K1 ..... 6.60
Gary,Ind. U5 ..... 5.20
Houston S5 ..... 5.60
Munhall,Pa. U5 ..... 5.20
So.Chicago,Ill. U5 ..... 5.20

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5 ..... 6.40
Bessemer,Ala. T2 ..... 6.40
Bethlehem,Pa. B2 ..... 6.45
Clairton,Pa. U5 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Fontana,Calif. K1 ..... 7.05
Gary,Ind. U5 ..... 6.40
Geneva,Utah C11 ..... 6.40
Houston S5 ..... 6.80
Ind.Harbor,Ind. I-2, Y1 ..... 6.40
Johnstown,Pa. B2 ..... 6.45
KansasCity,Mo. S5 ..... 7.00
Lackawanna,N.Y. B2 ..... 6.45
LosAngeles B3 ..... 7.10
Munhall,Pa. U5 ..... 6.40
Seattle B3 ..... 7.15
So.Chicago,Ill. U5, W14 ..... 6.40
So.SanFrancisco B3 ..... 7.05
Struthers,O. Y1 ..... 6.40

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 6.45
Lackawanna,N.Y. B2 ..... 6.45
Munhall,Pa. U5 ..... 6.40
So.Chicago,Ill. U5 ..... 6.40

PILING

BEARING PILES

Munhall,Pa. U5 ..... 4.25
So.Chicago,Ill. U5 ..... 4.25

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ..... 5.075
Lackawanna,N.Y. B2 ..... 5.075
Munhall,Pa. U5 ..... 5.075
So.Chicago,Ill. U5 ..... 5.075

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.225
Aliquippa,Pa. J5 ..... 4.225
Ashland,Ky.(15) A10 ..... 4.225
Bessemer,Ala. T2 ..... 4.225
Buffalo R2 ..... 4.225
Clairton,Pa. U5 ..... 4.225
Claymont,Del. C22 ..... 4.225
Cleveland J5, R2 ..... 4.225
Coatesville,Pa. L7 ..... 4.225
Conshohocken,Pa. A3 ..... 4.225
Ecorse,Mich. G5 ..... 4.325
Fairfield,Ala. T2 ..... 4.225
Fontana,Calif.(30) K1 ..... 4.875
Gary,Ind. U5 ..... 4.225
Geneva,Utah C11 ..... 4.225
GraniteCity,Ill. G4 ..... 4.425
Harrisburg,Pa. C5 ..... 3.975
Houston S5 ..... 4.625
Ind.Harbor,Ind. I-2, Y1 ..... 4.225
Johnstown,Pa. B2 ..... 4.225
Lackawanna,N.Y. B2 ..... 4.225
LoneStar, Tex. L6 ..... 4.55
Mansfield,O. E6 ..... 4.225
Minnequa,Colo. C10 ..... 5.075
Munhall,Pa. U5 ..... 4.225
Newport,Ky. N9 ..... 4.225
Pittsburgh J5 ..... 4.225
Riverdale,Ill. A1 ..... 4.225
Seattle B3 ..... 5.125
Sharon,Pa. S3 ..... 4.225
So.Chicago,Ill. R2 ..... 4.225
So.Chicago,Ill. U5,W14 ..... 4.225
SparrowsPoint,Md. B2 ..... 4.225
Steubenville,O. W10 ..... 4.225
Warren,O. R2 ..... 4.225
Weirton,W.Va. W6 ..... 4.225
Youngstown R2,U5,Y1 ..... 4.225

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ..... 6.025
Geneva,Utah C11 ..... 5.375

PLATES, Wrought Iron

Economy,Pa. B14 ..... 9.80

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.45
Bessemer,Ala. T2 ..... 6.45
Clairton,Pa. U5 ..... 6.45
Cleveland J5, R2 ..... 6.45
Conshohocken,Pa. A3 ..... 6.45
Ecorse,Mich. G5 ..... 6.55
Fairfield,Ala. T2 ..... 6.45
Fontana,Calif.(30) K1 ..... 7.15
Gary,Ind. U5 ..... 6.45
Geneva,Utah C11 ..... 6.45
Houston S5 ..... 6.85
Ind.Harbor,Ind. I-2, Y1 ..... 6.45
Johnstown,Pa. B2 ..... 6.45
Lackawanna,N.Y. B2 ..... 6.45
LosAngeles B3 ..... 7.35
Munhall,Pa. U5 ..... 6.45
Pittsburgh J5 ..... 6.45
Seattle B3 ..... 7.35
Sharon,Pa. S3 ..... 6.46
So.Chicago,Ill. U5, W14 ..... 6.45
SparrowsPoint,Md. B2 ..... 6.45
Youngstown U5, Y1 ..... 6.45

PLATES, Alloy

Claymont,Del. C22 ..... 5.80
Coatesville,Pa. L7 ..... 5.80
Fontana,Calif. K1 ..... 6.45
Gary,Ind. U5 ..... 5.80
Houston S5 ..... 6.20
Ind.Harbor,Ind. Y1 ..... 5.80
Johnstown,Pa B2 ..... 5.80
Munhall,Pa. U5 ..... 5.80
Newport,Ky. N9 ..... 5.80
Seattle B3 ..... 6.70
Sharon,Pa. S3 ..... 5.80
So.Chicago,Ill. U5, W14 ..... 5.80
SparrowsPoint,Md. B2 ..... 5.80
Youngstown Y1 ..... 5.80

FLOOR PLATES

Cleveland J5 ..... 5.275
Conshohocken,Pa. A3 ..... 5.275
Harrisburg,Pa. C5 ..... 5.15
Ind.Harbor,Ind. I-2 ..... 5.275
Munhall,Pa. U5 ..... 5.275
So.Chicago,Ill. U6 ..... 5.275

PLATES, Ingot Iron

Ashland c.l. (15) A10 ..... 4.475
Ashland l.c.l. (15) A10 ..... 4.975
Cleveland c.l. R2 ..... 4.825
Warren,O. c.l. R2 ..... 4.825

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 ..... 4.30
Aliquippa,Pa. J5 ..... 4.30
Alton,Ill. L1 ..... 4.50
Atlanta,Ga. A11 ..... 4.50
Bessemer,Ala. T2 ..... 4.30
Birmingham C15 ..... 4.30
Buffalo R2 ..... 4.30
Canton,O. R2 ..... 4.40
Clairton,Pa. U5 ..... 4.30
Cleveland R2 ..... 4.30
Ecorse,Mich. G5 ..... 4.40
Emeryville,Calif. J7 ..... 5.05
Fairfield,Ala. T2 ..... 4.30
Fairless,Pa. U5 ..... 4.45
Fontana,Calif. K1 ..... 5.00
Gary,Ind. U5 ..... 4.30
Houston S5 ..... 4.70
Ind.Harbor,Ind. I-2, Y1 ..... 4.30
Johnstown,Pa. B2 ..... 4.30
KansasCity,Mo. S5 ..... 4.90
Lackawanna,N.Y. B2 ..... 4.30
LosAngeles B3 ..... 5.00
Massillon,O. R2 ..... 4.40
Milton,Pa. M18 ..... 4.30
Minnequa,Colo. C10 ..... 4.75
Niles,Calif. P1 ..... 5.00
N.Tonawanda,N.Y. B11 ..... 4.30
Pittsburg,Calif. C11 ..... 5.00
Pittsburgh J5 ..... 4.30
Portland,Oreg. O4 ..... 5.05
Seattle B3, N14, P23 ..... 5.05
So.Chicago, R2,U5,W14 ..... 4.30
So.Duquesne,Pa. U5 ..... 4.30
So.SanFran.,Calif. B3 ..... 5.05
Sterling,Ill.(1) N15 ..... 4.30
Sterling,Ill. N15 ..... 4.40
Struthers,O. Y1 ..... 4.30
Torrance,Calif. C11 ..... 5.00
Warren,O. R2 ..... 4.30
Weirton,W.Va. W6 ..... 4.30
Youngstown R2, U5 ..... 4.30

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ..... 5.075
Buffalo R2 ..... 5.075
Canton,O. R2, T7 ..... 5.075
Clairton,Pa. U5 ..... 5.075
Detroit R7 ..... 5.075
Ecorse,Mich. G5 ..... 5.175
Fontana,Calif. K1 ..... 6.125
Fairless,Pa. U5 ..... 5.225
Gary,Ind. U5 ..... 5.075
Houston S5 ..... 5.475
Ind.Harbor,Ind. I-2, Y1 ..... 5.075
Johnstown,Pa. B2 ..... 5.075
KansasCity,Mo. S5 ..... 5.675
Lackawanna,N.Y. B2 ..... 5.075
LosAngeles B3 ..... 6.125
Massillon,O. R2 ..... 5.075
Midland,Pa. C18 ..... 5.075
So.Chicago R2, U5, W14 ..... 5.075
So.Duquesne,Pa. U5 ..... 5.075
Struthers,O. Y1 ..... 5.075
Warren,O. C17 ..... 5.075
Youngstown U5 ..... 5.075

BARS, H.R. Leaded Alloy

Warren,O. C17 ..... 5.825

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.45
Bessemer,Ala. T2 ..... 6.45
Bethlehem,Pa. B2 ..... 6.45
Clairton,Pa. U5 ..... 6.45
Cleveland R2 ..... 6.45
Ecorse,Mich. G5 ..... 6.55
Fairfield,Ala. T2 ..... 6.45
Fontana,Calif. K1 ..... 7.70
Gary,Ind. U5 ..... 6.45
Houston S5 ..... 6.85
Ind.Harb.,Ind. I-2, Y1 ..... 6.45
Johnstown,Pa. B2 ..... 6.45
KansasCity,Mo. S5 ..... 7.05
Lackawanna,N.Y. B2 ..... 6.45
LosAngeles B3 ..... 7.15
Pittsburgh J5 ..... 6.45
Seattle B3 ..... 7.20
So.Chicago W14 ..... 6.45
So.Duquesne,Pa. U5 ..... 6.45
So.SanFrancisco B3 ..... 7.20
Struthers,O. Y1 ..... 6.45
Warren,O. R2 ..... 6.45
Youngstown U5 ..... 6.45

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 ..... 4.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 4.30
Atlanta A11 ..... 4.50
Fontana,Calif. K1 ..... 5.00
Niles,Calif. P1 ..... 5.00
Pittsburgh J5 ..... 4.30
Portland,Oreg. O4 ..... 5.05
SanFrancisco S7 ..... 4.70

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ..... 5.20
Gary,Ind. U5 ..... 5.20
Houston S5 ..... 5.60
KansasCity S5 ..... 5.80
Youngstown U5 ..... 5.20

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ..... 5.40
BeaverFalls,Pa. M12, R2 ..... 5.40
Buffalo B5 ..... 5.45
Camden,N.J. P13 ..... 5.85
Carnegie,Pa. C12 ..... 5.40
Chicago W18 ..... 5.40
Cleveland A7, C20 ..... 5.40
Detroit R7 ..... 5.40
Detroit B5, P17 ..... 5.60
Donora,Pa. A7 ..... 5.40
Elyria,O. W8 ..... 5.40
FranklinPark,Ill. N5 ..... 5.40
Gary,Ind. R2 ..... 5.40
GreenBay,Wis. F7 ..... 5.40
Hammond,Ind. L2, M13 ..... 5.40
Hartford,Conn. R2 ..... 5.90
Harvey,Ill. B5 ..... 5.40
LosAngeles R2, S30 ..... 6.85
Mansfield,Mass. B5 ..... 5.95
Massillon,O. R2, R8 ..... 5.40
Monaca,Pa. S17 ..... 5.40
Newark,N.J. W18 ..... 5.85
NewCastle,Pa.(17) B4 ..... 5.40
Pittsburgh J5 ..... 5.40
Plymouth,Mich. P5 ..... 5.85
Putnam,Conn. W18 ..... 5.95
Readville,Mass. C14 ..... 5.95
St.Louis,Mo. M5 ..... 5.70
So.Chicago,Ill. W14 ..... 5.40
SpringCity,Pa. K3 ..... 5.85
Struthers,O. Y1 ..... 5.40
Waukegan,Ill. A7 ..... 5.40
Worcester,Mass. W19 ..... 5.85
Youngstown F3, Y1 ..... 5.40

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19 ..... 4.65

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ..... 6.625
BeaverFalls,Pa. M12,R2 ..... 6.625
Bethlehem,Pa. B2 ..... 6.625
Buffalo B5 ..... 6.625
Camden,N.J. P13 ..... 6.80
Canton,O. T7 ..... 6.625
Carnegie,Pa. C12 ..... 6.625
Chicago W18 ..... 6.625
Cleveland A7, C20 ..... 6.625
Detroit R7 ..... 6.625
Detroit B5, P17 ..... 6.825
Donora,Pa. A7 ..... 6.625
Elyria,O. W8 ..... 6.625
Gary,Ind. R2 ..... 6.625
GreenBay,Wis. F7 ..... 6.625
Hammond,Ind. L2, M13 ..... 6.625
Hartford,Conn. R2 ..... 6.925
Harvey,Ill. B5 ..... 6.626
Lackawanna,N.Y. B2 ..... 6.625
LosAngeles S30 ..... 8.30
Mansfield,Mass. B5 ..... 6.925
Massillon,O. R2, R8 ..... 6.625
Midland,Pa. C18 ..... 6.625
Monaca,Pa. S17 ..... 6.625
Newark,N.J. W18 ..... 6.80
Plymouth,Mich. P5 ..... 6.825
So.Chicago W14 ..... 6.626
SpringCity,Pa. K3 ..... 6.80
Struthers,O. Y1 ..... 6.625
Warren,O. C17 ..... 6.625
Waukegan,Ill. A7 ..... 6.625
Worcester,Mass. A7 ..... 6.925
Youngstown F3, Y1 ..... 6.625

BARS, C.F. Leaded Alloy

Cleveland C20 ..... 7.40
Warren,O. C17 ..... 7.525

BARS, Reinforcing (To fabricators)

Ala.City,Ala. R2 ..... 4.30
Atlanta A11 ..... 4.50
Birmingham C15 ..... 4.30
Buffalo R2 ..... 4.30
Cleveland R2 ..... 4.30
Emeryville,Calif. J7 ..... 5.05
Fairfield,Ala. T2 ..... 4.30
Fairless,Pa. U5 ..... 4.45
Fontana,Calif. K1 ..... 5.00
Ft.Worth,Tex.(42) T4 ..... 4.90
Gary,Ind. U5 ..... 4.30
Houston S5 ..... 4.70

Ind.Harbor, Ind. I-2, Y1 4.30
Johnstown, Pa. B2 ..... 4.30
KansasCity, Mo. S5 .... 4.90
Lackawanna, N.Y. B2 .... 4.30
LosAngeles B3 ..... 5.00
Milton, Pa. M18 ..... 4.30
Minnequa, Colo. C10 .... 4.75
Niles, Calif. P1 ..... 5.00
Pittsburg, Calif. C11 .... 5.00
Pittsburgh J5 ..... 4.30
Portland, Oreg. O4 ..... 5.05
SandSprings, Okla. S5 .. 5.15
Seattle B3, N14 P23 .. 5.05
So. Chicago R2 ..... 4.30
So. Duquesne, Pa. U5 .... 4.30
So. SanFrancisco B3 .... 5.05
SparrowsPoint, Md. B2 .. 4.30
Sterling, Ill. (1) N15 .... 4.30
Sterling, Ill. N15 ..... 4.40
Struthers, O. Y1 ..... 4.30
Torrance, Calif. C11 .... 5.00
Youngstown R2, U5 .... 4.30

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown, Pa., ¼-1" B2 5.70
KansasCity S5 ..... 6.50
LosAngeles B3 ..... 5.95
Marion, O. P11 ..... 5.55
Pittsburgh J5, U8 .... 5.72
Seattle B3, N14, P23 .. 6.15
So. SanFrancisco B3 ... 6.00
SparrowsPt. ¼-1" B2.. 5.70
Williamsport, Pa. S19 .. 5.60

RAIL STEEL BARS

Avis, Pa. (3) J8 ..... 4.25
ChicagoHts. (3) C2, I-2.. 4.20
ChicagoHts. (4) C2, I-2.. 4.30
Ft. Worth, Tex. (26) T4 .. 4.75
Franklin, Pa. (3) F5 .. 4.20
Franklin, Pa. (4) F5 .. 4.30
Marion, O. (3) P11 ..... 4.15
Moline, Ill. (3) R2 ..... 4.30
Tonawanda (3) B12 .... 4.15
Tonawanda (4) B12 .... 4.30
Williamsport, Pa. (3) S19 4.30

BARS, Wrought Iron

Economy, Pa. (S.R.) B14 10.85
Economy, Pa. (D.R.) B14 13.50
Economy (Staybolt) B14 13.80
McK.Rks (S.R.) L5 ... 10.85
McK.Rks. (D.R.) L5 .. 14.75
McK.Rks. (Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala. City, Ala. R2 ..... 4.05
Allenport, Pa. P7 ..... 4.05
Ashland, Ky. (8) A10 ... 4.05
Cleveland J5, R2 ..... 4.05
Conshohocken, Pa. A3 ... 4.10
Detroit (8) M1 ..... 4.20
Ecorse, Mich. G5 ..... 4.15
Fairfield, Ala. T2 ..... 4.05
Fairless, Pa. U5 ..... 4.10
Fontana, Calif. K1 .... 4.825
Gary, Ind. U5 ..... 4.05
Geneva, Utah C11 ..... 4.15
GraniteCity, Ill. G4 .... 4.25
Houston S5 ..... 4.45
Ind. Harbor, Ind. I-2, Y1. 4.05
Irvin, Pa. U5 ..... 4.05
Kokomo, Ind. C16 ..... 4.15
Lackawanna, N.Y. B2 .. 4.05
Mansfield, O. E6 (37) ... 4.05
Mansfield, O. E6(38) ... 4.80
Munhall, Pa. U5 ..... 4.05
Newport, Ky. N9 ..... 4.05
Niles, O. N12 ..... 4.05
Pittsburg, Calif. C11 .... 4.75
Pittsburgh J5 ..... 4.05
Portsmouth, O. P12 .... 4.05
Riverdale, Ill. A1 ..... 4.05
Sharon, Pa. S3 ..... 4.05
So. Chicago, Ill. W14 .... 4.05
SparrowsPoint, Md. B2 .. 4.05
Steubenville, O. W10 .... 4.05
Warren, O. R2 ..... 4.05
Weirton, W.Va. W6 .... 4.05
Youngstown U5, Y1 .... 4.05

SHEETS, H.R. (19 ga. lighter)

Ala. City, Ala. R2 ..... 5.35
Kokomo, Ind. C16 ..... 5.20
Niles, O. N12 ..... 4.95

SHEETS, Hot-Rolled Alloy

Ind. Harbor, Ind. Y1 .... 5.80
Youngstown Y1 ..... 5.80

SHEETS, H.R. (14 ga. heavier)
High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.10
Conshohocken, Pa. A3 .. 6.15
Ecorse, Mich. G5 ..... 6.20
Fairfield, Ala. T2 ..... 6.10
Fairless, Pa. U5 ..... 6.15
Fontana, Calif. K1 .... 6.875
Gary, Ind. U5 ..... 6.10
Ind. Harbor, Ind. I-2, Y1. 6.10
Irvin, Pa. U5 ..... 6.10
Lackawanna (35) B2 .... 6.10
Munhall, Pa. U5 ..... 6.10
Pittsburgh J5 ..... 6.10
Sharon, Pa. S3 ..... 6.10
So. Chicago, Ill. U5 .... 6.10
SparrowsPoint (36) B2 .. 6.10
Warren, O. R2 ..... 6.10
Weirton, W.Va. W6 .... 6.10
Youngstown U5, Y1 .... 6.10

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland, Ky. (8) A10 .... 4.30
Cleveland R2 ..... 4.65
Ind. Harbor, Ind. I-2 .... 4.30
Warren, O. R2 ..... 4.65

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport, Pa. P7 ..... 4.95
Cleveland J5, R2 ..... 4.95
Conshohocken, Pa. A3.... 5.00
Ecorse, Mich. G5 ..... 5.05
Fairfield, Ala. T2 ..... 4.95
Fairless, Pa. U5 ..... 5.00
Follansbee, W.Va. F4 ... 4.95
Fontana, Calif. K1 ..... 6.05
Gary, Ind. U5 ..... 4.95
GraniteCity, Ill. G4 .... 5.15
Ind. Harbor, Ind. I-2, Y1. 4.95
Irvin, Pa. U5 ..... 4.95
Lackawanna, N.Y. B2 .. 4.95
Middletown, O. A10 .... 4.95
Pittsburg, Calif. C11 .... 5.90
Pittsburgh J5 ..... 4.95
Portsmouth, O. P12 .... 4.95
SparrowsPoint, Md. B2.. 4.95
Steubenville, O. W10 .... 4.95
Warren, O. R2 ..... 4.95
Weirton, W.Va. W6 .... 4.95
Youngstown Y1 ..... 4.95

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 ..... 7.50
Ecorse, Mich. G5 ..... 7.60
Fairless, Pa. U5 ..... 7.55
Fontana, Calif. K1 ..... 8.55
Gary, Ind. U5 ..... 7.50
IndianaHarbor, Ind. Y1 .. 7.50
Irvin, Pa. U5 ..... 7.50
Lackawanna (37) B2 ... 7.50
Pittsburgh J5 ..... 7.50
SparrowsPoint (38) B2 .. 7.50
Warren, O. R2 ..... 7.50
Weirton, W.Va. W6 .... 7.50
Youngstown Y1 ..... 7.50

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 ..... 5.55
Middletown, O. A10 .... 5.45
Warren, O. R2 ..... 5.55

SHEETS, Culvert

(16 Ga.)	Cu Alloy	Cu Fe
Ashland, Ky.	A10 6.50	....
Canton, O.	R2 ....6.50	7.10
Fairfield	T2 ....5.70	....
Gary, Ind.	U5 ...5.70	5.95
Ind. Harbor	I-2 ..5.70	5.95
Irvin, Pa.	U5 ...5.70	....
Kokomo, Ind.	C16 .5.80	....
MartinsFry., O.	W10 5.70	....
Newport, Ky.	N9 ..5.70	5.95
Pitts., Calif.	C11 ..6.45	....
SparrowsPt.	B2 ..5.70	....

SHEETS, Culvert Pure Iron

Ashland, Ky. A10 ..... 6.75
Gary, Ind. U5 ..... 5.95
MartinsFerry, O. W10 .. 5.95

SHEETS, Galvanized Steel
Hot-Dipped

Ala. City, Ala. R2 ..... 5.45‡
Ashland, Ky. A10 ..... 5.45*
Butler, Pa. A10 ..... 5.45†
Canton, O. R2 ..... 5.45‡
Delphos, O. N16 ..... 6.10‡
Dover, O. R1 ..... 5.45‡
Fairfield, Ala. T2 ..... 5.45†
Gary, Ind. U5 ..... 5.45*
GraniteCity, Ill. G4 .... 5.65‡
Ind. Harbor, Ind. I-2 ... 5.45†
Irvin, Pa. U5 ..... 5.45†
Kokomo, Ind. C16 .... 5.55‡
MartinsFerry, O. W10 .. 5.45*
Middletown, O. A10 .... 5.45†
Newport, Ky. N9 ..... 5.45†
Niles, O. N12 ..... 5.45‡
Pittsburg, Calif. C11 .. 6.20*
SparrowsPt., Md. B2 .. 5.45‡
Steubenville, O. W10 ... 5.45‡
Weirton, W.Va. W6 .... 5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana, Calif. K1 .... 6.325

SHEETS, Galvanized
High-Strength Low-Alloy

Irvin, Pa. U5 ..... 8.20
SparrowsPoint (39) B2 .. 8.20

SHEETS, Galvannealed Steel

Canton, O. R2 ..... 5.85
Irvin, Pa. U5 ..... 5.85
Kokomo, Ind. C16 .... 5.95†
Newport, Ky. N9 ..... 5.85
Niles, O. N12 ..... 5.85

SHEETS, Galvanized Ingot Iron

Ashland, Ky. (8) A10 .... 5.70
Canton, O. R2 ..... 6.20

SHEETS, Galvanized
Ingot Iron
(Hot-dipped Continuous)

Ashland, Ky. A10 ..... 5.70
Butler, Pa. A10 ..... 5.70
Middletown, O. A10 .... 5.70

SHEETS, Electrogalvanized

Cleveland (28) R2 ..... 6.30
Niles, O. (28) R2 ..... 6.30
Weirton, W.Va. W6 .... 6.15

SHEETS, Aluminum Coated

Butler, Pa. A10 ..... 8.625

SHEETS, Enameling Iron

Ashland, Ky. (8) A10 ... 5.375
Cleveland R2 ..... 5.375
Gary, Ind. U5 ..... 5.375
GraniteCity, Ill. G4 .... 5.575
Ind. Harbor, Ind. I-2 ... 5.375
Irvin, Pa. U5 ..... 5.375
Middletown, O. A10 .... 5.375
Niles, O. N12 ..... 5.375
Youngstown Y1 ..... 5.375

BLUED STOCK, 29 ga.

Follansbee, W.Va. F4 .. 7.375
Follansbee (23) F4 .... 6.60
Yorkville, O. W10 ..... 7.375

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom, W.Va. W10 5.85
Gary, Ind. U5 ..... 5.85
Mansfield, O. E6 ..... 5.85
Middletown, O. A10 .... 5.85
Niles, O. N12 ..... 5.85
Weirton, W.Va. W6 .... 5.85

SHEETS, Long Terne, Ingot Iron

Middletown, O., A10 .... 6.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div. Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co. I-6
C20 Cuyahoga Steel & Wire I-7
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng. HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv., EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless WeldedProducts
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan.San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...4.05
Allenport,Pa. P7 .....4.05
Alton,Ill. L1 .....4.225
Ashland,Ky.(8) A10 ....4.05
Atlanta A11 .....4.25
Bessemer,Ala. T2 .....4.05
Birmingham C15 .....4.05
Bridgeport,Conn.(10)S15 4.05
Buffalo(27) R2 .....4.05
Conshohocken,Pa. A3 ...4.10
Detroit M1 .....4.20
Ecorse,Mich. G5 .....4.15
Fairfield,Ala. T2 .....4.05
Fontana,Calif. K1 .....4.825
Gary,Ind. U5 .....4.05
Houston,Tex. S5 .....4.45
Ind.Harbor,Ind. I-2, Y1.4.05
Johnstown,Pa.(25) B2 ..4.05
KansasCity,Mo.(9) S5 ..4.65
Lackaw'na,N.Y.(25) B2.4.05
LosAngeles(25) B3 .....4.80
Milton,Pa. M18 .....4.05
Minnequa,Colo. C10 ....5.15
NewBritain(10) S15 ....4.05
N.Tonawanda,N.Y. B11..4.05
Pittsburg,Calif. C11 ....4.80
Portsmouth,O. P12 .....4.05
Riverdale,Ill. A1 .....4.05
SanFrancisco S7 .....5.00
Seattle(25) B3, P23 ....5.05
Seattle N14 .....5.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
So.SanFrancisco(25) B3.4.80
SparrowsPoint,Md. B2 ..4.05
Sterling(1) N15 .....4.05
Sterling,Ill. N15 .....4.15
Torrance,Calif. C11 ....4.80
Warren,O. R2 .....4.05
Weirton,W.Va. W6 .....4.05
Youngstown U5 .....4.05

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.70
Fontana,Calif. K1 .....8.10
Gary,Ind. U5 .....6.70
Houston,Tex. S5 .....7.10
Ind.Harbor,Ind. Y1 .....6.70
KansasCity,Mo. S5 .....7.30
LosAngeles B3 .....7.90
NewBritn.,Conn.(10)S15 6.45
Newport,Ky. N9 .....6.70
Seattle P23 .....7.80
Sharon,Pa. S3 .....6.70
So.Chicago W14 .....6.70
Youngstown U5, Y1 ....6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 .....6.15
Conshohocken,Pa. A3 ...6.15
Ecorse,Mich. G5 .....6.25
Fairfield,Ala. T2 .....6.15
Fontana,Calif. K1 .....7.25
Gary,Ind. U5 .....6.15
Houston S5 .....6.55
Ind.Harbor,Ind. I-2, Y1.6.15
KansasCity,Mo. S5 .....6.75
Lackawanna,N.Y. B2 ...6.15
LosAngeles(25) B3 .....6.90
Seattle(25) B3, P23 ....7.15
Sharon,Pa. S3 .....6.15
So.SanFrancisco(25) B3.6.90
SparrowsPoint,Md. B2 ..6.15
Warren,O. R2 .....6.15
Weirton,W.Va. W6 .....6.15
Youngstown U5, Y1 ....6.15

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....4.30
Warren,O. R2 .....4.65

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....5.75
Baltimore T6 .....5.75
Bridgeport,Conn.(10)S15 5.75
Cleveland A7, J5 .....5.75
Conshohocken,Pa. A3 ...5.80
Dearborn,Mich. D3 .....5.85
Detroit M1, P20 .....5.90
Detroit D2 .....5.85
Dover,O. G6 .....5.75
Ecorse,Mich. G5 .....5.85
Follansbee,W.Va. F4 ...5.75
Fontana,Calif. K1 .....7.65
FranklinPark,Ill. T6 ....5.85
Ind.Harbor,Ind. Y1 .....5.75
Ind.Harbor,Ind. I-2 ....5.85
Indianapolis C8 .....5.90
Lackawanna,N.Y. B2 ...5.75
LosAngeles C1 .....7.80
Mattapan,Mass. T6 ....6.30
Middletown,O. A10 .....5.75
NewBedford,Mass. R10..6.20
NewBritain(10) S15 ....5.75
NewCastle,Pa. B4, E5 ..5.75
NewHaven,Conn. A7 ....6.50
NewHaven,Conn. D2 ....6.20
Pawtucket,R.I. R3 .....6.40
Pawtucket,R.I. N8 .....6.30
Pittsburgh J5 .....5.75
Portsmouth,O. P12 .....5.75
Riverdale,Ill. A1 .....5.85
Rome,N.Y.(32) R6 .....5.75
Sharon,Pa. S3 .....5.75
SparrowsPt.,Md. B2 ....5.75
Trenton,N.J.(31) R5 ...7.30
Wallingford,Conn. W2 ..6.20
Warren,O. B9, R2, T5..5.75
Weirton,W.Va. W6 .....5.75
Worcester,Mass. A7 ....6.60
Youngstown C8, Y1 ....5.75

STRIP, Cold-Rolled Alloy

Carnegie,Pa. S18 .....12.45
Cleveland A7 .....12.45
Dover,O. G6 .....12.45
Fontana,Calif. K1 .....14.55
FranklinPark,Ill. T6 ...12.45
Harrison,N.J. C18 .....12.45
Mattapan,Mass. T6 ....12.80
Pawtucket,R.I. N8 ....12.80
Sharon,Pa. S3 .....12.45
Worcester,Mass. A7 ....12.75
Youngstown C8 .....12.90

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7, J5 .....8.60
Dearborn,Mich. D3 .....8.70
Dover,O. G6 .....8.60
Ecorse,Mich. G5 .....8.70

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.75	8.35	9.30	11.45	14.15
Bridgeport,Conn.(10) S15.	5.75	8.05	9.00	11.15	13.85
Bristol,Conn. W1	...	...	9.30	11.45	....
Carnegie,Pa. S18	....	8.05	9.00	11.15	13.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland C7	....	8.05	9.00	11.15	13.85
Dearborn,Mich. D3	5.85	8.25	9.20	....	....
Detroit D2	5.85	8.25	9.20	10.95	....
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	5.85	8.05	9.00	11.15	13.85
Harrison,N.J. C18	...	...	9.30	11.45	14.15
Indianapolis C8	6.00	8.20	9.00	11.15	13.85
Mattapan, Mass. T6	6.30	8.35	9.30	11.45	14.15
NewBritn.,Conn.(10) S15.	5.75	8.05	9.00	11.15	13.85
NewCastle,Pa. B4	5.75	8.05	9.00	11.15	....
NewCastle,Pa. E5	5.75	8.05	9.00	11.15	13.85
NewHaven,Conn. D2	6.20	8.35	9.30	11.25	....
New York W3	...	8.35	9.30	11.45	14.15
Pawtucket,R.I. N8	6.30	8.35	9.30	11.45	14.15
Riverdale,Ill.(1) A1	5.85	8.05	9.00	11.15	13.85
Rome,N.Y.(32) R6	5.75	8.05	9.00	10.95	13.25
Sharon,Pa. S3	5.75	8.05	9.00	11.15	13.85
Trenton,N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford,Conn. W2 ...	6.20	8.35	9.30	11.45	14.15
Warren,O. T5	5.75	8.05	9.00	11.15	13.85
Weirton,W.Va. W6	5.75	8.05	9.00	11.15	13.85
Worcester,Mass. A7, T6..	6.60	8.35	9.30	11.45	14.15
Youngstown C8	5.85	8.05	9.00	11.15	13.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.90	15.60	....
Buffalo W12	...	...	12.90	...	....
Harrison,N.J. C18	...	...	12.90	15.60	19.00
NewYork W3	...	...	12.90	15.60	19.00
Trenton,N.J. R5	...	...	12.90	15.60	19.00
Worcester,Mass. A7, T6..	...	...	12.90	15.60	19.00
Worcester,Mass. W12	...	...	12.90	....	....
Youngstown C8	...	...	13.25	15.95	19.35

Ind.Harbor,Ind. Y1 .....8.60
Lackawanna,N.Y. B2 ..8.425
Pittsburgh J5 .....8.60
Sharon,Pa. S3 .....8.60
SparrowsPoint,Md. B2..8.425
Warren,O. R2 .....8.60
Weirton,W.Va. W6 .....8.60
Youngstown Y1 .....8.60

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....6.35

STRIP, Electrogalvanized

Cleveland A7 .....5.75*
Dover,O. G6 .....5.75*
Riverdale,Ill. A1 .....5.85*
Youngstown C8 .....5.75*
Warren,O. B9, T5 ....5.75*
Weirton,W.Va. W6 ....5.75*
Worcester,Mass. A7 ..6.60

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....6.15
Warren,O. B9 .....6.15

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.775
Riverdale,Ill. A1 .....4.625
Sharon,Pa. S3 .....4.475
Youngstown U5 .....4.475

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	...	9.10	10.10	11.00
Brackenridge,Pa. A4	....	...	9.10	10.10	11.00
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	....
Vandergrift,Pa. U5	....	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville,O. A10	....	8.50	9.10	10.10	11.00

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	...	9.85	10.85	11.75
GraniteCity,Ill. G4	8.425*	8.95*	9.55*	10.55*	....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift,Pa. U5	....	9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.225*	8.75*	9.35*	10.35*	11.25*
Warren,O. R2	8.225†	9.25	9.85	10.85	11.75
Zanesville,O. A10	....	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.95	12.50	13.00	14.00
Brackenridge,Pa. A4	11.95	....	....	....
Newport,Ky. N9	11.95	....	....	....
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95§	12.50§	13.00§	14.00§

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.00	16.60	17.10	....
Butler,Pa. A10	....	....	16.60	17.10	....
Vandergrift,Pa. U5	14.00	15.00	16.60	17.10	12.70
Warren,O. R2	....	....	....	....	12.70‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower. § Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Fairfield,Ala. T2	7.60	7.85	8.25
Fairless,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Irvin,Pa. U5	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	6.175	....	....
Niles,O. R2	6.175	6.375	6.575

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5..	$8.80	$9.05
Fairfield,Ala. T2 .	8.90	9.15
Fairless,Pa. U5 ..	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1..	8.80	9.05
Irvin,Pa. U5	8.80	9.05
Pitts.,Cal. C11 ..	9.55	9.80
Sp.Pt.,Md. B2 ..	8.90	9.15
Warren,O. R2 ...	8.80	9.05
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10.	8.80	9.05

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.60
Fairfield,Ala. T2	6.70
Fairless,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1.	6.60
Irvin,Pa. U5	6.60
Niles,O. R2	6.60
Pittsburg Calif. C11	7.35
SparrowsPoint,Md. B2..	6.70
Warren,O. R2	6.60
Weirton,W.Va. W6	6.60
Yorkville,O. W10	6.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	6.20
Gary,Ind. U5	6.20
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.20
Irvin,Pa. U5	6.20
Yorkville,O. W10	6.20

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5	$7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...5.75
Aliquippa,Pa. J5 .....5.75
Alton,Ill. L1 .....5.925
Atlanta A11 .....5.95
Bartonville,Ill. K4 .....5.85
Buffalo W12 .....5.75
Chicago W13 .....5.75
Cleveland A7, C20 .....5.75
Crawfordsville,Ind. MS..5.85
Donora,Pa. A7 .....5.75
Duluth,Minn. A7 .....5.75
Fairfield,Ala. T2 .....5.75
Fostoria,O.(24) S1 .....5.95
Houston S5 .....6.15
Jacksonville,Fla. M8 ....6.27
Johnstown,Pa. B2 .....5.75
Joliet,Ill. A7 .....5.75
KansasCity,Mo. S5 .....6.35
Kokomo,Ind. C16 .....5.85
LosAngeles B3 .....6.70
Minnequa,Colo. C10 ....6.00
Monessen,Pa. P7 .....5.75
Newark 6-8 ga. I-1 ....6.40
No.Tonawanda B11 ....5.75
Palmer,Mass. W12 ....6.05
Pittsburg,Calif. C11 ....6.70
Portsmouth,O. P12 .....5.75
Rankin,Pa. A7 .....5.75
So.Chicago,Ill. R2 .....5.75
So.SanFrancisco C10 ....6.70
SparrowsPoint,Md. B2 ..5.85
Sterling,Ill.(1) N15 ....5.75
Sterling,Ill. N15 .....5.85
Struthers,O. Y1 .....5.75
Waukegan,Ill. A7 .....5.75
Worcester,Mass. A7 ....6.05

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....7.20
Alton,Ill. L1 .....7.375
Bartonville,Ill. K4 .....7.30
Buffalo W12 .....7.20
Cleveland A7 .....7.20
Donora,Pa. A7 .....7.20
Duluth,Minn. A7 .....7.20
Fostoria,O. S1 .....7.20
Johnstown,Pa. B2 .....7.20
LosAngeles B3 .....8.15
Millbury,Mass.(12) N6 ..7.50
Minnequa,Colo. C10 ....7.45
Monessen,Pa. P7, P16....7.20
Muncie,Ind. I-7 .....7.40
Palmer,Mass. W12 .....7.50
Pittsburg,Calif. C11 ....8.15
Portsmouth,O. P12 .....7.20
Roebling,N.J. R5 .....7.50
So.Chicago,Ill. R2 .....7.20
So.SanFrancisco C10 ....8.15
SparrowsPt.,Md. B2 .....7.30
Struthers,O. Y1 .....7.20
Trenton,N.J. A7 .....7.50
Waukegan,Ill. A7 .....7.20
Worcester A7,J4,T6,W12 7.50

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....6.90
Alton,Ill. L1 .....7.075
Buffalo W12 .....6.90
Cleveland A7 .....6.90
Donora,Pa. A7 .....6.90
Duluth,Minn. A7 .....6.90
Johnstown,Pa. B2 .....6.90
KansasCity,Mo. S5 .....7.50
LosAngeles B3 .....7.85
Minnequa,Colo. C10 ...7.075
Monessen,Pa. P7, P16...6.90
NewHaven,Conn. A7 ....7.20
Palmer,Mass. W12 .....7.20
Pittsburg,Calif. C11 ....7.85
Portsmouth,O. P12 .....6.90
Roebling,N.J. R5 .....7.20
So.Chicago,Ill. R2 .....6.90
So.SanFrancisco C10 ....7.85
SparrowsPoint,Md. B2 ...7.00
Struthers,O. Y1 .....6.90
Trenton,N.J. A7 .....7.20
Waukegan,Ill. A7 .....6.90
Worcester,Mass. A7 ....7.20

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....11.375
Bartonville,Ill. K4 .....11.30
Buffalo W12 .....11.20
Chicago W13 .....11.20
Cleveland A7 .....11.20
Crawfordsville,Ind. MS.11.30
Fostoria,O. S1 .....11.20
Jacksonville,Fla. M8 ...11.73
Johnstown,Pa. B2 .....11.20
Kokomo,Ind. C16 .....11.20
Minnequa,Colo. C10 ....10.95
Monessen,Pa. P16 .....11.20
Muncie,Ind. I-7 .....11.40
Palmer,Mass. W12 .....11.50
Roebling,N.J. R5 .....11.50
So.SanFrancisco C10 ....11.55
Waukegan,Ill. A7 .....11.20
Worcester,Mass. A7,T6.11.50

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4 .....9.90
Buffalo W12 .....9.90
Johnstown,Pa. B2 .....9.90
Minnequa,Colo. C10 ...10.025
Monessen,Pa. P16 .....9.90
Muncie,Ind. I-7 .....10.10
Portsmouth,O. P12 .....9.90
Roebling,N.J. R5 .....10.20
SparrowsPt.,Md. B2 ...10.00

ROPE WIRE (A)

Alton,Ill. L1 .....9.75
Bartonville,Ill. K4 .....9.75
Buffalo W12 .....9.75
Fostoria,O. S1 .....9.75
Johnstown,Pa. B2 .....9.75
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Portsmouth,O. P12 .....9.75
Roebling,N.J. R5 .....10.05
SparrowsPt. B2 .....9.85
Struthers,O. Y1 .....9.75
Worcester J4, T6 .....9.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Alton,Ill. L1	13.25
Bartonville,Ill. K4	13.25
Monessen, Pa. P16	13.15
Portsmouth,O. P12	13.15
Roebling,N.J. R5	13.45

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	7.95
Baltimore T6	8.25
Buffalo W12	7.95
Cleveland A7	7.95
Crawfordsville,Ind. M8	8.05
Dover,O. G6	7.95
Fostoria,O. S1	7.95
FranklinPark,Ill. T6	8.05
Kokomo,Ind. C16	8.05
Massillon,O. R8	7.95
Milwaukee C23	8.15
Monessen,Pa. P7, P16	7.95
Pawtucket,R.I. N8	8.25
Rome,N.Y.(32) R6	7.95
Trenton,N.J. R5	8.25
Worcester A7, T6, W12	8.25

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	6.90 7.30**
Aliquippa J5	6.90 7.425‡
Atlanta A11	7.00 7.55
Bartonville(48) K4	7.00 7.55
Buffalo W12	6.90 7.30†
Cleveland A7	6.90 ....
Crawfordsville M8	7.00 7.55
Donora,Pa. A7	6.90 7.30†
Duluth,Minn. A7	6.90 7.30†
Fairfield T2	6.90 7.30†
Houston,Tex. S5	7.30 7.70†
Jacks'ville,Fla. M8	7.425 7.95
JohnstownB2(48)	6.90 7.45*
Joliet,Ill. A7	6.90 7.30†
KansasCity,Mo. S5	7.50 7.90†
Kokomo C16	7.00 7.40†
LosAngeles B3	7.85 ....
Minnequa C10	7.15 7.55**
Monessen P7 (48)	6.90 7.45
Palmer W12	7.20 7.60†
Pitts.,Calif. C11	7.85 8.25†
Portsmouth,O. P12	6.90 ....
Rankin A7	6.90 7.30†
So.Chicago R2	6.90 7.30**
S.S.Fran. C10	7.85 8.25**
SparrwsPt.B2(48),	7.00 7.55*
Sterling(1)(48)N15	6.90 7.45
Struthers,O.(48)Y1	6.90 7.40‡
Worcester A7	7.20 ....

*Based on 11c zinc; †5c zinc; ‡ Less than 10c zinc; **Subject to zinc equalization extras.

WOVEN FENCE, 9-15½Ga.

	Col.
Ala.City,Ala. R2	146**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Aliq'ppa,Pa.9-14½ga.J5	149‡
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	146†
Duluth,Minn. A7	146†
Fairfield,Ala. T2	146†
Houston,Tex. S5	154†
Johnstown,Pa.(43) B2	149
Joliet,Ill. A7	146†
KansasCity,Mo. S5	158†
Kokomo,Ind. C16	148†
Minnequa,Colo. C10	154**
Monessen,Pa. 9 ga. P17	149
Pittsburg,Calif. C11	169†
Rankin,Pa. A7	146†
So.Chicago,Ill. R2	146**
Sterling,Ill.(1) N15	149

†Based on 5c zinc; *11c zinc; ‡ 10c zinc; **Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala R2	155
Atlanta A11	157
Bartonville,Ill. K4	157
Crawfordsville,Ind. M8	157
Donora,Pa. A7	155
Duluth,Minn.A7	155
Fairfield,Ala. T2	155
Joliet,Ill. A7	155
Houston S5	163
KansasCity,Mo. S5	167
Kokomo,Ind C16	157
Minnequa,Colo. C10	160
Pittsburg,Calif. C11	179
So.Chicago,Ill. R2	150
So.SanFran.,Calif. C10	179
SparrowsPoint,Md. B2	157
Sterling,Ill.(1) N15	155

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	159**
Aliquippa J5	156‡
Atlanta A11	164
Bartonville,Ill. K4	164
Crawfordsville,Ind. M8	164
Donora,Pa. A7	159†
Duluth,Minn. A7	159†
Fairfield,Ala. T2	159†
Houston,Tex. S5	167†
Johnstown,Pa. B2	162*
Joliet,Ill. A7	159†
Kankakee,Ill. W10	164
KansasCity,Mo. S5	171†
Kokomo,Ind. C16	161†
Minnequa,Colo. C10	165**
Monessen,Pa. P7	162
Pittsburg,Calif. C11	179†
Rankin,Pa. A7	159†
So.Chicago,Ill. R2	159**
S.SanFrancisco C10	179**
SparrowsPoint,Md. B2	164*
Sterling,Ill. (1) N15	162

†Based on 5c zinc; *11c zinc; ‡10c zinc; **Subject to zinc equalization extras.

WIRE (16 gage)

	An'ld Galv. Stone	Stone
Ala.City R2	13.15	14.70**
Bartonville K4	13.25	15.10
Buffalo W12	13.15	....
Cleveland A7	13.15	....
Crawfrdsville M8	13.25	15.10
Fostoria,O. S1	13.25	14.80†
Johnstown B2	13.15	15.00*
Kokomo C16	13.25	14.80†
Minnequa C10	13.40	15.10**
Palmer,Mas.W12	13.15	14.70†
Pitts.,Calif. C11	13.50	15.05†
So.Chicago R2	13.15	14.70
SparrowsPt. B2	13.25	15.10*
Sterling(1) N15	13.15	15.00
Waukegan A7	13.15	14.70†
Worcester A7	13.45	....

*Based on 11c zinc; †5c zinc; ‡ 10c zinc; **Subject to zinc equalization extras.

NAILS, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	137
Atlanta A11	139
Bartonville,Ill. K4	139
Chicago,Ill. W13	137
Cleveland A9	142
Crawfordsville,Ind. M8	139
Donora,Pa. A7	137
Duluth,Minn. A7	137
Fairfield,Ala. T2	137
Galveston,Tex. D7	139
Houston,Tex. S5	145
Johnstown,Pa. B2	137
Joliet,Ill. A7	137
KansasCity,Mo. S5	149
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	156
Rankin,Pa. A7	137
So.Chicago,Ill. R2	137
SparrowsPt.,Md. B2	139
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	143

NAILS, CUT (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$8.30
Wheeling,W.Va. W10	8.30

STAPLES, Polished Stock

To dealers & mfrs. (7)	Col.
Aliquippa,Pa. J5	138
Atlanta A11	140
Bartonville,Ill. K4	139
Crawfordsville,Ind. M8	139
Donora,Pa. A7	138
Duluth,Minn. A7	138
Fairfield,Ala. T2	138
Johnstown,Pa. B2	138
Joliet,Ill. A7	138
Kokomo,Ind. C16	139
Minnequa,Colo. C10	143
Monessen,Pa. P7	137
Pittsburg,Calif. C11	157
Rankin,Pa. A7	138
SparrowsPt.,Md. B2	140
Sterling,Ill. (1) N15	137
Worcester,Mass. A7	144

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	150
Duluth,Minn. A7	150
Franklin,Pa. F5	150
Johnstown,Pa. B2	150
Marion,O. P11	150
Minnequa,Colo. C10	155
Moline,Ill. R2	155
So.Chicago,Ill. R2	150
Tonawanda,N.Y. B12	150
Williamsport,Pa. S19	150

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, per cent off list, f.o.b. midwestern plants)

4 in. and shorter: ½-in. & smaller diam	2
Over 4 in. through 6 in.: ½ in. & smaller diam	+3
6 in. and shorter: ⅝-in. and ⅝-in.	+4
¾ in. and larger	+6
Longer than 6 in.: All diameters	+15
Lag bolts, all diams.: 6 in. and shorter	6
Over 6 in. long	+2
Ribbed Necked Carriage	+4
Blank	10
Plow	23
Step, Elevator, Tap and Sleigh Shoes	10
Tire Bolts	+3
Boiler & Fitting-Up Bolts	21

NUTS

H.P. and C.P., regular & heavy: Square, all sizes	55
H.P., Hex, regular & heavy: ⅝" and smaller	55
⅞" to 1⅛", inclusive.	58
1¼" to 1½", inclusive	60
1⅝" and larger	55
C.P. Hex regular & heavy: All sizes	55
Hot Galv. Nuts (all types): ¾" or smaller	38
⅞" to 1½", inclusive.	41
Finished Hex Nuts: New standard, all sizes	55
Semifinished & Slotted Hex: Regular and heavy, all sizes	55

SQUARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)

1 in. diam. x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼ in. diam. & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	*43*
Plated finishes	*23*

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter: ¼ in. through ⅝-in.	38
¾-in. through 1 in.	15
Longer than 6 in.: ¼-in. through ⅝-in.	20
¾-in. through 1 in.	7

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.25
⅞-in. under..List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.59	19.00
1¼	13	....	23.21	18.77
1½	13	21.40	25.65	20.75
1¾	13	25.28	30.31	24.52
2	13	28.33	33.97	27.48
2¼	13	31.91	38.26	30.95
2½	12	34.63	41.52	33.59
2¾	12	38.15	45.74	37.00
2¾	12	41.31	49.53	40.07
3	12	44.05	52.82	42.72

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	4.45	4.35	4.40	5.35
Ensley,Ala. T2	4.45	4.35	...	5.35
Fairfield,Ala. T2	...	...	...	5.35
Gary,Ind. U5	4.45	4.35	4.40	...
Huntington,W.Va. W7	...	...	...	5.35
IndianaHarbor,Ind. I-2	4.45	4.35	4.40	...
Johnstown,Pa. B2	...	...	...	(16)5.35
Lackawanna,N.Y. B2	4.45	4.35	...	5.35
Minnequa,Colo. C10	4.45	4.35	...	5.85
Steelton,Pa. B2	4.45	4.35	...	5.35
Williamsport,Pa. S19	...	...	...	5.35

TIE PLATES

Fairfield,Ala. T2	5.275
Gary,Ind. U5	5.275
Ind.Harbor,Ind. I-2	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Seattle B3	5.425
Steelton,Pa. B2	5.275
Torrance,Calif. C11	5.425

TRACK BOLTS (20) Treated

Cleveland R2	11.50
KansasCity,Mo. S5	11.50
Lebanon,Pa. B2	11.50
Minnequa, Colo. C10	11.50
Pittsburgh O3, P14	11.50
Seattle,Wash. B3	12.00

AXLES

Ind.Harbor,Ind. S13	6.75
Johnstown,Pa. B2	6.75

JOINT BARS

Bessemer,Pa. U5	5.425
Fairfield,Ala. T2	5.425
Ind.Harbor,Ind. I-2	5.425
Joliet,Ill. U5	5.425
Lackawanna,N.Y. B2	5.425
Minnequa,Colo. C10	5.425
Steelton,Pa. B2	5.425

SCREW SPIKES

Cleveland R2	11.00

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.30
Ind.Harbor,Ind. I-2, Y1	7.30
KanssasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.30
Minnequa,Colo. C10	7.30
Pittsburgh J5	7.30
Seattle B3	7.80
So.Chicago,Ill. R2	7.30
Struthers,O. Y1	7.30
Youngstown R2	7.30

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed.	15.25
Unannealed: Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.i.f. N.Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags	9.50
Electrolytic iron: Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum: Atomized, 500 lb drums, frgt. allowed: Carlots	30.00
Ton lots	32.00
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	29.75-37.25†
Bronze, 5000-lb lots	48.75-52.00†
Copper: Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese: Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	94.00
Nickel-Silver, 5000-lb lots	45.50‡
Nickel-Silver, 5000-lb lots	49.00**
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	91.00
Tin	14.50*
Zinc, 5000-lb lots	17.25-31.00‡
Tungsten Melting grade, 99% 60 to 200 mesh: 1000 lb and over	Dollars 4.95
Less than 1000 lb	5.10
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½" to 1 7/16"; 1 7/16" to 1 15/16" 4.78c; 1 15/16" to 7 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.95c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c H.S.-L.A.
(31) Widths over ⅝-in.; 6.40c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & heavier; 60" & narrower.
(38) 14 gage & lighter.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.10c.
(43) 9-14½ gage.
(48) 6-7 gage.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Ambridge, Pa. N2	13.5	...	17.5	...	20	...	21.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Youngstown Y1	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Alton, Ill. L1	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Benwood, W. Va. W10	24	+4.5	15.25	+10.25	7.25	+17.25	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Butler, Pa. F6	25	+3.5	17	+8.5	9.5	+15	....	..	....	...	....	..	....	....
Etna, Pa. N2	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Fairless, Pa. N3	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Fontana, Calif. K1	...	...	....	....	....	....	10.75	+6.5	13.75	+2.5	16.25	1	18.75	2.25
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	22.75	5.5	25.75	9.5	28.25	13	30.75	14.25
Lorain, O. N3	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sharon, Pa. S4	25	+3.5	17	+8.5	9.5	+15	....	..	....	...	....	..	....	....
Sharon, Pa. M6	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sparrows Pt., Md. B2	23	+5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Youngstown R2, Y1	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Wheatland, Pa. W9	23	+5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Alton, Ill. L1	30.25	14.25	30.75	14.75	32.25	15	32.25	15	....	...	....	...
Benwood, W. Va. W10	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Etna, Pa. N2	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Fairless, Pa. N3	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Fontana, Calif. K1	19.25	3.25	19.75	3.75	21.25	4	21.25	4	12.5	+5.25	12.5	+5.25
Ind. Harbor, Ind. Y1	31.25	15.25	31.75	15.75	33.25	16	33.25	16	24.5	6.75	25.5	6.75
Lorain, O. N3	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sharon, Pa. M6	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sparrows Pt., Md. B2	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Wheatland, Pa. W9	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

*Galvanized pipe discounts based on current price of zinc (11.50c, East St. Louis).

Stainless Steel

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. H.R. Strip	Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.75	21.00	30.00	34.75	30.25	35.75	37.75	41.75	38.75
302	17.75	23.25	30.25	35.00	32.50	36.00	38.00	42.00	42.00
302B	19.00	25.00	31.00	35.00	35.50	36.00	38.00	45.25	45.25
303	....	25.25	32.75	37.75	....	38.75	40.25	46.00	46.00
304	19.00	24.50	31.75	36.75	35.00	38.00	40.50	44.50	44.50
304L	....	....	36.75	41.75	40.00	43.00	45.50	49.50	49.50
305	20.50	26.50	33.50	37.25	38.00	38.00	41.00	47.50	47.50
308	20.75	27.25	36.25	41.75	39.00	43.00	47.00	49.00	49.00
309	27.75	36.00	44.00	50.50	50.50	51.75	55.00	63.25	63.25
309S	29.75	38.75	48.00	55.75	55.25	56.75	60.25	69.75	69.75
310	35.00	45.25	58.75	68.25	64.75	69.50	71.00	74.25	74.25
314	....	....	....	....	....	....	71.00	....	....
316	29.25	37.50	47.75	55.75	54.50	56.75	60.00	64.00	64.00
316L	....	....	52.75	60.75	59.50	61.75	65.00	69.00	69.00
317	34.25	44.75	58.50	68.00	68.75	69.50	72.00	78.25	78.25
321	23.50	30.25	36.00	41.50	41.75	42.75	46.50	51.25	51.25
330	....	....	61.50	....	....	72.00	73.25	81.25	81.25
347	35.50	46.75	54.75	62.50	63.00	64.25	69.25	77.50	77.50
18-8CbTa	29.25	38.25	46.00	52.25	53.00	53.75	58.50	66.50	66.50
403	....	....	27.00	30.75	....	32.00	34.25	....	....
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.25	26.25	28.75	30.00	34.25	34.25
414	....	....	24.50	....	....	29.25	30.50	35.25	35.25
416	....	....	24.50	28.25	....	29.25	....	....	....
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	....	25.00	28.75	....	29.75	....	....	....
431	15.00	19.25	25.00	28.75	28.00	29.75	31.00	35.75	35.75
446	....	....	33.50	38.25	50.25	39.50	40.75	59.75	59.75

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
Stainless:			
302	....	31.00	31.00
304	27.60–28.10	32.50–33.20	32.50
310	36.50	41.00	....
316	32.60–33.10	37.70–42.75	42.75
318	37.00–37.50	42.20–42.70	....
321	29.36–29.80	34.40–37.00	37.00
347	30.40–30.90	35.50–40.50	40.50
405	23.40–23.90	30.60–31.10	....
410	22.00–23.40	30.10–30.60	....
430	23.40	30.60	....
Inconel	47.90	63.90	....
Nickel	39.50	54.10	....
Monel	40.80	54.80	....
L-Nickel	41.70	58.50	....
Copper*	....	....	46.00

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	28.85	35.85	25.00	32.25

* Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, Inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	0.31-.315	W-Cr Hot Work	0.425
Special Carbon	0.37	V-Cr Hot Work	0.445
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.030
18.25	4.25	1	4.75	...	2.245-2.415
18	4	2	9	...	2.615
18	4	2	....	...	1.705
18	4	1	....	...	1.540
14	4	2	5	...	2.185
13.75	3.75	2	5	...	2.185
13.5	4	3	....	...	1.805
9	3.5	..	....	5	1.115
6	4	2	....	5	1.045
6	4	3	....	6	1.290
1.5	4	1	....	8.5	0.900

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity,Ala. R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	56.50†	....
Woodward,Ala. W15	52.38	52.88	56.50†	....
Cincinnati, deld.	....	60.58	....	....
Buffalo District				
Buffalo R2	56.00	56.50	57.00	57.50
Buffalo H1	56.00	56.50	57.00	57.50
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	57.50
Boston, deld.	66.65	67.15	67.65	....
Rochester, N.Y., deld.	59.02	59.52	60.02	....
Syracuse,N.Y., deld.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Chicago R2	56.00	....	56.50	....
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, deld.	58.17	58.67	58.67	59.17
MuskegonMich., deld.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	57.00
Akron,O., deld.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
New York, deld.	....	62.28	62.78	....
Newark, deld.	61.02	61.52	62.02	62.52
Birdsboro,Pa. B10	58.00	58.50	....	....
Chester,Pa. C31	....	48.50	49.00	....
Philadelphia, deld.	....	50.16	50.66	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, deld.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	59.50
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	57.87	57.87	58.37
McKeesRocks, deld.	....	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, deld.	....	58.16	58.16	58.66
Verona,Trafford, deld.	58.19	58.69	58.69	59.19
Brackenridge, deld.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O. deld.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	60.50	61.00	61.50	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar, Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T2	....	52.50*	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, deld.	61.76	62.26	....	....

*Low phos, southern grade. †Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.00 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$65.00
Buffalo H1	66.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$80.50
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	85.00
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	88.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.00
Rockwood,Tenn. T3	70.00
Steelton,Pa. B2	64.00
Philadelphia, deld.	67.55
Troy,N.Y. R2	64.00

Warehouse Steel Products

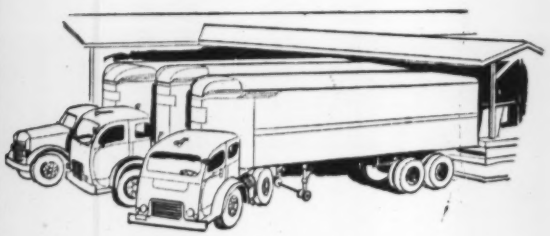
Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Birmingham and St. Paul, 15 cents; Philadelphia, New York, Boston and Los Angeles, 10 cents; Buffalo, 25 cents on C.R. and galvanized sheets, C.F. and alloy bars and 20 cents on other commodities; Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302‡‡	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††[9]		Carbon	Floor
Baltimore	6.02	7.51	7.79	....	6.69	...	6.68	8.52[6]	12.04	6.72	6.37	7.76
Birmingham	6.35	7.35	8.25[3]	....	6.60	...	6.50	9.10	....	6.65	6.65	8.45
Boston	7.23	8.23	9.52	45.28[9]	7.47	...	7.20	8.60	12.45	7.49	7.37	8.50
Buffalo	6.35	7.40	8.79	....	6.70	...	6.50	7.85	12.15	6.72	6.65	7.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.38	7.38	8.30	46.05	6.62	...	6.51	7.50	11.90	6.69	6.52	7.64
Cincinnati	6.49	7.37	8.30	45.80	6.86	...	6.75	7.80	12.15	6.86	6.81	7.89
Cleveland	6.38	7.38	8.45	45.66	6.72	...	6.57	7.60	11.96	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	43.50	6.90	7.36	6.79	7.79	12.10	7.16	6.80	7.83
Erie, Pa.	6.35	7.38	8.30	....	6.70	...	6.50	7.45[4]	....	6.69	6.52	7.64
Houston	7.35	7.80	9.93	....	7.70	9.30	7.70	9.50	....	7.60	7.35	8.75
Los Angeles	7.50	9.35	9.95	50.15	7.85	11.75	7.45	10.15	13.20	7.65	7.45	9.55
Milwaukee	6.47	7.47	8.39	....	6.71	...	6.60	7.69	11.99	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.85	....	7.04	6.87	...
New York	6.97	7.91	8.79	44.95	7.56	...	7.37	8.73[6]	12.28	7.38	7.27	8.68
Norfolk, Va.	7.00	...	...	....	7.10	...	7.10	8.60	....	7.10	7.10	7.95
Philadelphia	6.19	7.44	8.26	41.98[9]	6.96	8.80	6.74	8.36[6]	12.10	6.54	6.49	7.51**
Pittsburgh	6.38	7.38	8.30	45.50	6.72	...	6.51	7.85	11.90	6.69	6.52	7.64
Portland, Oreg.	7.60	8.75	9.35	48.50	7.85	...	7.55	10.95	14.00	7.50	7.45	9.35
Richmond, Va.	6.43	7.39	8.67	....	6.77	...	6.71	8.33	....	7.08	6.65	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.89	12.19	7.09	6.81	7.93
St. Paul	7.04	8.04	8.96	....	7.28	...	7.17	8.26	....	7.35	7.18	8.30
San Francisco	7.55	8.95	8.70	51.65	7.80	...	7.35	10.05	13.20	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	50.50	8.20	...	7.80	10.95	13.65	7.75	7.80	9.60
Spokane	8.35	9.65[7]	10.05	....	7.80	...	7.80	10.85‡‡	14.40	7.45	7.55	9.60
Washington	6.70	7.99	7.97	....	7.37	...	7.38	9.09	....	7.31	7.05	8.16

*Prices do not include gage extras; †prices include gage and coating extras, based on 11-cent zinc except in New York, Philadelphia, Los Angeles, Cincinnati, Cleveland (11.50-cent zinc) and in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extra; ‡as rolled; **½-in. and heavier; ††as annealed; ‡‡prices include $2 for crating; §§under ⅛-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle, 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999; [3]—500 to 9999 lb; [4]—4000 lb and over; [6]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 lb to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

Roy Fruehauf, President, Fruehauf Trailer Company



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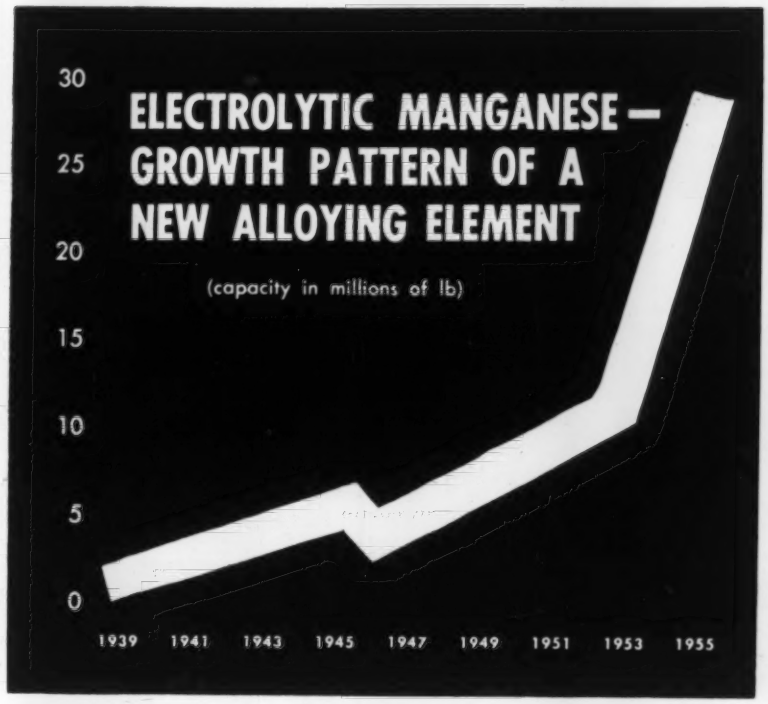

Pure Manganese: More on the Way

CAPACITY UP 80 PER CENT: For most industries that would be quite an expansion even if spread over a number of years. But the electrolytic manganese people can boast of such a hike in just one year. In fact, large increases in capacity are old stuff to this small, young industry, as seen in the chart above.

In 1939, the first year of commercial production of the metal in this country, less than 50,000 lb were offered to an uncertain market. But the market was fast in developing to the point where today the 15-million-lb capacity is synonymous with production and use. With the addition this month of 12-million lb by Electro Metallurgical Co. at its new Marietta, O., plant, it remains to be seen if that relation can continue into 1955.

Good Bet—There was little question that new capacity was needed to keep up with the rising demand for this alloying element. Pioneer producer in the U. S., Electro Manganese Corp., Knoxville, Tenn., found it necessary to increase capacity practically from the start 16 years ago. In 1952, the company doubled its 7.2-million-lb capacity, and by late 1953 it was producing at the rate of nearly 15 million lb a year. Then came the second entrant into the field, Electro Metallurgical. Those two are the only producers today.

Electrolytic manganese is 99.9-plus per cent pure. It is the end product of an electrowinning process and is supplied in chip form. As the advantages of this purity became known, use of the metal grew, first in the nonferrous alloy field and then as an additive for stainless and alloy steels. The nearly complete elimination of such impurities as carbon, phosphorus and silicon in this product makes it easier to control the tolerance of those elements in various types of steel. The fact that high purity manganese can substitute for nickel to make an austenitic stainless has lent impetus to the expansion. A large part of current production is going into conventional stainless production.

Plates . . .

Plate Prices, Page 92

Plate demand has leveled off seasonally, but most producers think the mild uptrend of recent weeks will be resumed in January.

At Pittsburgh several fabricators are cutting their requirements and inventories in a customary year-end slowdown. No major improvement is expected in plates until requirements of the railroads increase.

Consumers expect they will have to pay more for their stainless clad plate in the near future. Cladders haven't announced any change, but the move is considered likely. Largely as a result of the advance in nickel a few weeks ago, prices of stainless steel products move up.

Lukens Steel Co. has advanced prices on alloy plates containing nickel, effective Dec. 20. Increases in the grades usually furnished by the company range between $1 and $5 a ton, and reflect the recent increases in the price of nickel.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 93 & 94

Drop of $1 per ton in sheet prices in the Detroit area by a leading district producer will be met by out-district sellers through absorption of additional freight. This was indicated last week as market observers sought to determine just what motivated the action, which applied to sheets, bars, plates and other products.

Until seasonal influences set in, the demand for the flat-rolled products has been unusually brisk, particularly in cold-rolled and galvanized, as well as certain specialties. Hot-rolled sheets have been in steadily improving demand, too.

Sheetmakers at Chicago view the recent pressure for cold-rolled as temporary and attributable almost entirely to the all-out production of new model automobiles. This view is held despite the fact their books are full for first quarter and April prospects look strong. Even in this position some mills continue to sell their products outside the automotive field lest the car bubble burst. Strength in galvanized and electrical sheets is considered much more normal than is that in cold-rolled sheets.

Most Pittsburgh district producers did not shut down their facilities over Christmas. Orders are too heavy to permit a slowdown of cold-finished sheet production. Order books are pretty well filled through the first quarter.

In New England demand for sheets and strip is heaviest from automotive suppliers, and this group has covered needs further in advance. There are a few weak spots in industrial strip demand, notably bicycle manufacture. One bicycle plant has closed down for six weeks after laying off 240 workers permanently in November. Imports are knocking out domestic production.

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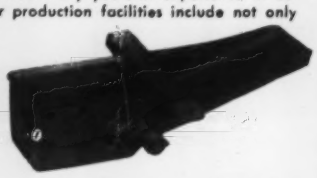

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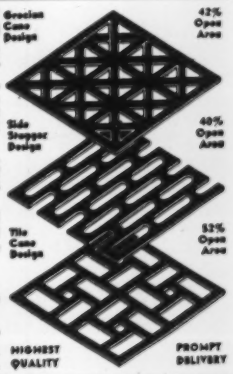

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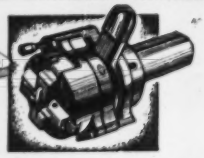

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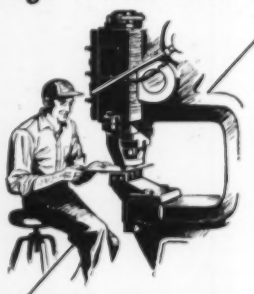

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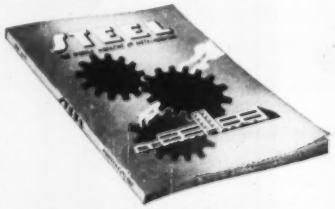

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Scrap . . .

Scrap Prices, Page 102

Philadelphia — Sentiment in the scrap market is mixed, with some domestic orders for No. 1 heavy melting steel and No. 1 bundles being placed at as high as $32.50, delivered, and No. 2 heavy melting at $29. No. 1 busheling prices are quoted in the $30.50-$31.50 range.

Local mill buying is not large, but continued buying for export is imparting strength to the domestic market. Three boats, with combined cargoes of 27,000 tons, are being loaded. No. 1 and No. 2 heavy melting steels and No. 2 bundles are the major items involved. Foreign buying calls for shipments into February.

Pittsburgh—Scrap activity is restricted to filling December orders already received, but the market is described as "basically sound." While there are no prospects of immediate large-size orders, steel mills here won't slow down completely for Christmas and should resume full operations early in January. Increased demand for 430 bundles and solids resulted in higher prices paid for that stainless scrap grade.

Boston—Export of steel scrap from this port has been in excess of 60,000 tons. Two ships recently cleared with 11,000 tons. Prices paid for heavy melting grades at dock are about $3 under earlier peak. Domestic buying is slow. Additional electric furnace capacity at Bridgeport, Conn., will bolster steel scrap needs next year. Open hearths at the Stanley Works, Bridgeport, have been operating mostly on scrap for many months.

New York—Scrap brokers have advanced buying prices on machine shop turnings to a spread of $10 to $10.50. Prices otherwise are unchanged with trading fairly active. This applies to domestic as well as foreign business.

Buffalo—The scrap market continues to mark time as dealers ship against old orders. Dealers are cutting some into stocks. Hope for higher prices based on 100 per cent steelmaking operations is offset partially by easier tendencies at other consuming points. Canadian buying of cast iron continues.

Cincinnati—New buying interest pushed the prices of No. 1 grades up $1 to $31-$32. A generally stronger market has emerged. Newport Steel Corp. is planning to put three open hearth furnaces into operation before first of the year. This is expected to create increased demand for scrap.

Chicago—Little activity in steelmaking scrap buying seems likely over remainder of this year. There is a possibility higher prices may prevail when mills next come into the market. Basis for this is the fact that brokers have been paying dealers 50 cents to $1 per ton more for some items to complete old orders. Better gray iron foundry activity has firmed up cast grades $1 to $2 per ton.

Los Angeles—Most scrap dealers are looking forward to the New Year with anticipation. Inquiries during fourth quarter have been more numerous than usual for this time of year, although December sales were negligible. Total 1954 sales volume was well below that of 1953.

San Francisco—Changes in the steel scrap market the rest of the year are extremely unlikely. In keeping with the usual seasonal contraction, sales are light.

Seattle—The scrap market continues firm, No. 1 and No. 2 heavy melting quoted $27 and $23 respectively and motor blocks $25, electric furnace $32, No. 1 cupola $32 to $35.

Some larger buyers are out of the market, having good inventories. While there is no scrap surplus, there is enough to meet current demand.

Late this month the Navy will invite bids for about 700 tons at the Puget Sound yard.

Japan continues in need of scrap. Two full cargoes have been shipped from the Hawaiian Islands to Japan. The freight rate figures about $10 a gross ton, charterer paying loading and discharge costs.

Warehouse . . .

Warehouse Prices, Page 97

Distributors are increasing their quotations on stainless steel, following recent mill advances. Prices otherwise are unchanged, with the undertone soft on some products due to keen competition.

Demand is seasonally slow, and shipments will taper over the holidays. Distributors have booked a substantial volume of orders for January delivery, although small fabricators are reluctant to place first-quarter orders until after Jan. 1. Most of them are elated over first-quarter prospects.

December business is about the same as it was in the same month a year ago. Shipments of sheets, including galvanized, continue strong. Tubing, bars and plate are moving slowly as year-end approaches. Distributors' bookings have not paralleled the 30 to 35 per cent increase in mill production, even in flat-rolled products where upturn has been heaviest.

Warehouse stocks are in better balance, and, in most instances, slowly moving items that were taken in earlier in the year have been liquidated.

Structural Shapes . . .

Structural Shape Prices, Page 92

Most structural steel fabricators hold substantial order backlogs. As a result, bidding is more selective, notably in the East where considerable work continues in prospect despite seasonal leveling off.

The year is winding up in a flurry of placements, including several sizable jobs and a diversity of smaller work. Bids have been closed on some large projects, including a 10,000-ton state viaduct in Niagara county,

(*Please turn to page* 104)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Dec. 22	$32.50
Dec. 15	32.42
Nov. Avg.	33.29
Dec. 1953	39.69
Dec. 1949	28.03

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting..	32.00-33.00
No. 2 heavy melting..	28.00-29.00
No. 2 bundles	26.00-27.00
No. 1 bundles	32.00-33.00
No. 1 busheling	32.00-33.00
Machine shop turnings	18.00-19.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings.	22.00-23.00
Cast iron borings	22.00-23.00
Cut structurals, 5 ft lengths	35.00-36.00
Heavy turnings	29.00-30.00
Punchings & plate scrap	37.00-38.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Charging box cast	31.00-32.00
Heavy breakable cast.	30.00-31.00
Unstripped motor blocks	22.00-23.00
No. 1 machinery cast..	41.00-42.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 2-ft and under.	46.00-47.00
Rails, 18-in. and under	47.00-48.00
Rails, random lengths	40.00-41.00
Railroad specialties	*39.00-40.00*

Stainless Steel Scrap

18-8 bundles & solids.	185.00-195.00
18-8 turnings	90.00-95.00
430 bundles & solids	*85.00-90.00*
430 turnings	60.00-62.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting..	32.00-33.00
No. 2 heavy melting..	28.00-29.00
No. 1 bundles	32.00-33.00
No. 2 bundles	24.00-25.00
No. 1 busheling	32.00-33.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings..	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	34.00-35.00
Cut structural plate 2 ft and under	38.00-39.00
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Stove plate	38.00-39.00
Heavy breakable cast..	30.00-31.00
Unstripped motor blocks	30.00-31.00
Brake shoes	31.00-32.00
Clean auto cast	44.00-45.00
No. 1 wheels	37.00-38.00
Burnt cast	29.00-30.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
R.R. malleable	44.00-45.00
Rails, 3-ft and under.	46.00-47.00
Rails, 18-in. and under	47.00-48.00
Rails, random lengths.	43.00-44.00
Cast steel	36.00-37.00
Railroad specialties	36.00-37.00
Uncut tires	37.00-38.00
Angles, splice bars	42.00-43.00
Rails, rerolling	52.00-53.00

Stainless Steel (Brokers' Buying Prices)

18-8 bundles, solids	*190.00-200.00*
18-8 turnings	*80.00-90.00*
430, clips, bundles, solids	*80.00*
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting..	34.00-35.00
No. 2 heavy melting..	29.00-30.00
No. 1 bundles	34.00-35.00
No. 2 bundles	26.00-27.00
Machine shop turnings	14.00-15.00
Short shovel turnings..	22.00-23.00
Cast iron borings	22.00-23.00
Low phos.	36.00-37.00
Electric furnace bundles	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00

CHICAGO

No. 1 heavy melting..	32.00-34.00
No. 2 heavy melting..	30.00-31.00
No. 1 factory bundles	34.00-35.00
No. 1 dealer bundles..	32.00-33.00
No. 2 bundles	23.00-24.00
No. 1 busheling	32.00-34.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings.	18.00-19.00
Cast iron borings	18.00-19.00
Cut structurals, 3-ft..	36.00-37.00
Punchings & plate scrap	36.00-37.00
Electric furnace bundles	34.00-35.00

Cast Iron Grades

No. 1 cupola	*39.00-41.00*
Stove plate	*34.00-35.00*
Unstripped motor blocks	*26.00-27.00*
Clean auto cast	*44.00-45.00*
Drop broken machinery	*44.00-45.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*37.00-38.00*
R.R. malleable	42.00-44.00
Rails, 2-ft and under	50.00-51.00
Rails, 18-in. and under	51.00-52.00
Angles, splice bars	43.00-44.00
Rails, rerolling	52.00-53.00

Stainless Steel Scrap

18-8 bundles & solids.	175.00-180.00
18-8 turnings	75.00-80.00
430 bundles & solids..	65.00-70.00
430 turnings	30.00-40.00

Chicago Mercantile Exchange

(Week ended Dec. 21)

No. 1 Heavy Melting

	High	Low	Close
Jan.	36.00	35.00	36.00
Mar.	....	....	36.00*

No. 2 Heavy Melting

Feb.	....	....	33.125*

Sales (40-ton Units): None. *Nominal. †Bid.

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting...	27.00
No. 2 heavy melting...	19.00
No. 1 bundles	27.00
No. 2 bundles	18.00
No. 1 busheling	26.00
Machine shop turnings	11.00
Mixed borings, turnings	11.00
Short shovel turnings..	14.00
Punchings & plate scrap	*29.00*

Cast Iron Grades

Charging box cast	27.00
No. 1 cupola	34.00
Stove plate	30.00
Heavy breakable	25.00
Unstripped motor blocks	20.00
Clean auto cast	38.00
Malleable	30.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting..	31.00-32.00
No. 2 heavy melting..	25.00-26.00
No. 1 bundles	*31.00-32.00*
No. 2 bundles	20.00-21.00
No. 1 busheling	*31.00-32.00*
Machine shop turnings	16.00-17.00
Mixed borings, turnings	17.00-18.00
Short shovel turnings..	17.00-18.00
Cast iron borings	17.00-18.00
Low phos. 18-in.	34.00-35.00

Cast Iron Grades

No. 1 cupola	39.00
Heavy breakable cast..	35.00
Charging box cast	36.00
Drop broken machinery	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 18-in. and under	46.00-47.00
Rails, random lengths.	38.00-39.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*31.50-32.50*
No. 2 heavy melting	*29.00-29.50*
No. 1 bundles	*31.50-32.50*
No. 2 bundles	26.00-26.50
No. 1 busheling	30.00-30.50*
Electric furnace bundles	33.50*
Machine shop turnings.	18.00
Mixed borings, turnings	19.00-19.50
Short shovel turnings ..	21.00-21.50
Structurals & plate ..	34.50-35.00
Heavy turnings	29.50-30.00
Couplers, springs, wheels	35.00
Rail crops, 2 ft & under	46.00

Cast Iron Grades

No. 1 cupola	35.00
Malleable	41.50-43.00
Heavy breakable cast..	36.00-36.50
Drop broken machinery	42.00-43.00

*Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting...	26.00-27.00
No. 2 heavy melting...	24.00-25.00
No. 1 bundles	26.00-27.00
No. 2 bundles	20.00-21.00
Machine shop turnings.	*10.00-10.50*
Mixed borings, short turnings	11.00-12.00
Low phos. (structural & plate)	29.00-30.00
Short shovel turnings ..	12.00-13.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	22.00-23.00

Stainless Steel

18-8 sheets, clips, solids	175.00-180.00
18-8 borings, turnings..	75.00-80.00
430 sheets, clips, solids	55.00-60.00
410 sheets, clips, solids	45.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting..	22.00-23.00
No. 2 heavy melting..	16.00-16.50
No. 1 bundles	23.00-24.00
No. 2 bundles	14.50-15.00
Mixed borings, turnings	9.50-10.00
Machine shop turnings	7.50-8.00
Short shovel turnings.	10.50-11.00
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast..	32.00-33.00

BUFFALO

No. 1 heavy melting..	30.00-31.00
No. 2 heavy melting..	27.50-28.50
No. 1 bundles	30.00-31.00
No. 2 bundles	25.50-26.50
No. 1 busheling	30.00-31.00
Machine shop turnings	18.00-19.00
Mixed boring, turnings	20.00-21.00
Short shovel turnings.	21.00-22.00
Cast iron borings	20.00-21.00
Low phos.	33.00-34.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths..	35.00-36.00
Rails, 3 ft and under.	42.00-43.00
Railroad specialties ..	36.50-37.50

BIRMINGHAM

No. 1 heavy melting..	26.00-27.00
No. 2 heavy melting..	24.00-25.00
No. 1 bundles	23.00-24.00
No. 2 bundles	19.00-20.00
Cast iron borings	16.00-17.00
Short shovel turnings.	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	29.00-30.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate..	33.00-34.00
Structural plate, 2 ft ..	33.00-34.00
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	30.00-31.00
Rails, 18-in. and under	40.00-41.00
Rails, rerolling	40.00-41.00
Angles, splice bars	38.00-39.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting..	30.00
No. 2 heavy melting..	28.00
No. 1 bundles	30.00
No. 2 bundles	23.50
Machine shop turnings	13.00
Short shovel turnings.	15.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	32.50
Heavy breakable cast .	32.50
Unstripped motor blocks	32.50
Brake shoes	30.00
Clean auto cast	41.00
Stove plate	35.00

Railroad Scrap

No. 1 R.R. heavy melt	35.00
Rails, 18-in. and under	46.00
Rails, random lengths.	43.00-45.00
Rail, rerolling	51.00
Angles, splice bars	40.00-41.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting..	27.00
No. 2 heavy melting..	23.00
No. 1 bundles	21.00
No. 2 bundles	17.00
No. 3 bundles	13.00
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings..	12.00
Electric furnace, No. 1	32.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	32.00-35.00
Heavy breakable cast..	23.00
Unstripped motor blocks	25.00
No. 1 wheels	21.00
Stove plate(f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap (Delivered consumer plant)

Rails, random lengths..	30.00-34.00

LOS ANGELES

No. 1 heavy melting..	20.00
No. 2 heavy melting..	16.00
No. 1 bundles	20.00
No. 2 bundles	16.00
Machine shop turnings.	5.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-44.00

SAN FRANCISCO

No. 1 heavy melting..	24.00
No. 2 heavy melting..	20.00
No. 1 bundles	23.00
No. 2 bundles	18.00
No. 1 busheling	24.00
Machine shop turnings	6.00
Mixed borings, turnings	6.00
Short shovel turnings.	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast..	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

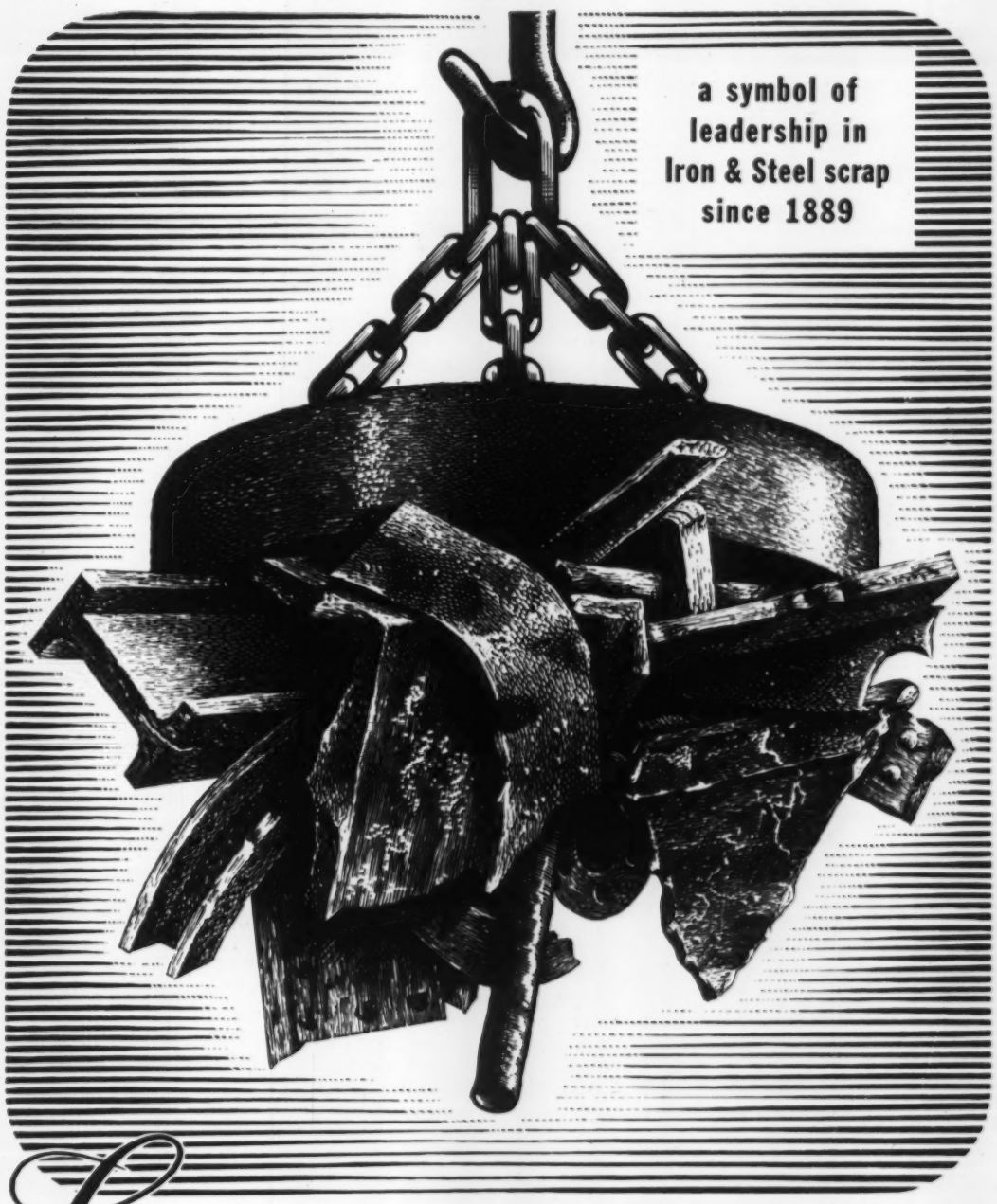
(Delivered prices)

No. 1 heavy melting..	26.00
No. 2 heavy melting..	23.00
No. 1 bundles	26.00
No. 2 bundles	21.00
Mixed steel scrap	20.00
Mixed borings, turnings	12.00
Rails, remelting	35.00
Busheling, new factory: Prepared	24.00
Unprepared	20.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast..	42.00-45.00

†F.o.b., shipping point.



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CHICAGO, ILLINOIS	LOS ANGELES, CAL.	ST. LOUIS, MO.
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	SEATTLE, WASH.	

EXPORTS-IMPORTS—LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* FORENTRACO

(*Concluded from page* 101)

N. Y., on which some action may be taken before the year ends.

Fabricating plants in the Pacific Northwest report fair backlogs, but they need new contracts to maintain operations at present levels.

Tin Plate . . .

Tin Plate Prices, Page 94

Orders for first quarter tin plate are slightly more substantial. Despite a slow fourth quarter, 1954 sales are expected to be satisfactory. Consumers are placing orders far ahead, and there will probably be no major gain in demand until second quarter.

At least one Pittsburgh producer is flexible enough to run other products through its tin mill, thus keeping its mill running at capacity.

Shipments of metal cans are running nip and tuck with a year ago, on the basis of returns for the first 10 months, as recorded by the Bureau of Census, Department of Commerce.

Shipments during that period amounted to 3,589,887 tons, compared with 3,575,443 in the corresponding period of 1953. October shipments amounted to 362,759 tons, against 467,992 in September, and 368,717 in October, 1953.

Cans for fruit and vegetables (including juice) totaled 1,121,109 tons during the first 10 months, off slightly from the 1,248,874 moved in the same period last year. Beer cans totaled 565,906 tons during the first 10 months, compared with 547,936 in the first 10 months of 1953. Open top cans (one quart to five quart) amounted to 230,463 tons in the first 10 months, against 216,536 in the same period the year before.

Tubular Goods . . .

Tubular Goods Prices, Page 96

Merchant pipe and specialty tube sales are dwindling in a general year-end weakening of tubular demand. Pipe is subject to year-end inventory cutbacks. Sales should perk up in January. There's weakness in mechanical tube sales due to the shortage of large military orders. Orders are also slim from boilermakers. Customers are taking advantage of quick mill delivery by placing orders with little lead time.

Markets for oil country seamless tubular goods are more competitive than at any time since before the Korean war. While inventory cutbacks are expected to be completed next month by oil well drillers, the market will remain competitive in 1955.

New business is slow with cast iron pipe agencies. Two small jobs are pending in Oregon, bids in. For The Dalles dam, 225 tons of cast iron and steel pipe will be required.

Steel Bars . . .

Bar Prices, Page 92

While a decline of $1 per ton in prices at Detroit holds the attention of the market, there is no sign that this reduction will spread to other consuming areas but consumers at other points, especially those engaged on automotive work can be expected to press for similar concessions.

Business in bars, all classifications and grades, has been on the upturn of late, though buying has not been as robust in this area as in other products, notably cold-rolled sheets and strip. Sales are expected to slacken over the holiday week, but, generally, a fairly active first quarter is anticipated by the mills.

Ferroalloy Prices

FERROALLOY quotations remain unchanged. The current price schedule was published in full on page 131 of the Dec. 20 issue of STEEL.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 92

Northwest Steel Rolling Mills Inc. plant at Seattle is down for two weeks for annual overhaul. Meanwhile, the electric furnaces are operating. Oregon Steel Mills, Portland, holds a fair order backlog and plans no holiday shutdown. Largest reinforcing contract pending in the Pacific Northwest consists of 5000 tons for The Dalles dam, general bids opened Dec. 15. For Seattle's Gorge dam expansion, 1000 tons of bars will be required. Reports of expected heavy military construtcion projects are not reflected in Los Angeles area sales charts, with fabricators reporting activity in December below normal.

Pig Iron . . .

Pig Iron Prices, Page 97

With many foundries suspending operations from Christmas through New Year, the movement of pig iron has reached the lowest point since the vacation season last summer. However, sellers anticipate an early resumption of activity to levels which prevailed throughout the greater part of December. The volume of business may be still further increased by the end of January.

Importation of pig iron remains light and a relatively small tonnage is being offered.

Blast furnace production increased in November, totaling 5,256,900 net tons against 4,983,680 tons in October, reports the American Iron & Steel Institute. Production in November a year ago amounted to 6,062,600 tons. Of total production during the month, 5,204,446 tons were pig iron and 52,454 tons ferromanganese and spiegeleisen.

Production in the first 11 months of this year was 53,100,760 tons, of which 52,591,818 tons were pig iron and 508,942 tons were ferromanganese and spiegeleisen. This compares with 70,063,919 tons in the like period of 1953, of which 69,274,783 tons were pig iron and 789,136 tons were ferromanganese and spiegeleisen.

Iron Ore . . .

Iron Ore Prices, Page 106

Consumption of Lake Superior iron ore increased to 5,845,262 gross tons in November, reports the Lake Superior Iron Ore Association. Consumption was 5,398,398 tons in October. In November, 1953, it amounted to 7,521,841 gross tons.

Cumulative consumption in the first 11 months of 1954 was 60,686,161 tons, compared with 87,865,821 in the like period of 1953.

Stocks of ore at furnaces and on Lake Erie docks on Dec. 1 totaled 49,868,892 gross tons. This compares with 51,868,432 tons on Nov. 1, and with 54,981,324 tons on Dec. 1, 1953.

Twenty more blast furnaces were on the active list Dec. 1. On Nov. 1, there were 161 active stacks out of a total of 205 in the U. S. and Canada. A year ago there were 168 stacks on the active list.

Stainless Steel . . .

Stainless Steel Prices, Page 96

While it's too early to judge if higher prices for nickel-bearing stainless steel have had any effect on the demand for it, most producers expect the effect to be slight. They say orders are still being received at a good rate.

Rails, Cars . . .

Track Material Prices, Page 95

Domestic freight car orders in November totaled 3754 cars, bringing the backlog of cars on order as of Dec. 1 up to 14,805, compared with 12,853 on Nov. 1, reports the American Railway Car Institute and the Association of American Railroads.

Domestic freight car deliveries in November totaled 1302 against 1817 in October and 6137 in November, 1953.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6500 tons, Turtle river bridge, contracts 2 and 3, Glynn county, Georgia, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

5800 tons, Southeast state turnpike viaduct, Jersey City, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

5675 tons, section, state thruway, Westchester county, New York, through Arthur A. Johnson Corp., general contractor, to Phoenix Bridge Co., Phoenixville, Pa.

4000 tons, 711 Third Ave. office building, Third Ave. near 44th St., New York, through William Kaufman, to Bethlehem Steel Co., Bethlehem, Pa.

3300 tons, superstructure, Barnhart Island bridge, over the St. Lawrence river, near Massena, N. Y., awarded by Power Authority of State of New York, 270 Broadway, New York, to Mt. Vernon Bridge Co., Mt. Vernon, O.

780 tons, section, state thruway, Westchester county, New York, through Mt. Vernon Contracting Co., to the American Bridge Division, U. S. Steel Corp., Pittsburgh.

720 tons, office, Fifth Ave. Jewelers Exchange, West 47th Street, New York, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

600 tons, ocean cargo shed, Brooklyn, N. Y., through George W. Rodgers Construction Corp., to the American Bridge Division, U.S. Steel Corp., Pittsburgh.

525 tons, section, Midtown Expressway, New York, through Slattery Contracting Co., general contractor, to Central Iron Works, Bronx, that city.

465 tons, Cape Fear steam electric station, Moncure, N. C., through Ebasco Services Inc., New York, to Bristol Steel & Iron Co., Bristol, Tenn.

460 tons, office building, Paul Tishman Inc., 50 East 56th Street, New York, to Schacht Steel Construction Inc., that city.

450 tons, joint junior and senior high school, Connellsville, Pa., to Robert Reynolds Co., Avonmore, Pa.

420 tons, senior high school, Cottman street, Philadelphia, through McCloskey & Co., general contractors, to Max Corchin & Son, that city.

420 tons, section, Brooklyn-Queens expressway, New York, through Frank Mascali & Sons Inc., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

415 tons, apartment, 35th St. near Second Ave., Manhattan, New York, through H. R. H. Construction Co., general contractor, to Jones & Laughlin Steel Corp., Pittsburgh.

350 tons, high school, Bloomfield, Conn., to Topper & Griggs (Bethlehem Fabricators, Inc.) Hartford, Conn., structurals, and Webrib Steel Corp., Hartford, reinforcing; A. F. Peaslee, Inc., Hartford, general contractor.

350 tons, warehouse No. 7, American Stores Co., Kearney, N. J., through B. J. Lucarelle, general contractor, to Eastern Steel Structures Inc.

345 tons, junior high school No. 67, Queens, New York, through the Planet Construction Co., general contractor, to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

330 tons, Sheraton hall and ballroom, Sheraton Park Hotel, Washington, D. C., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Gilbane Building Co., Washington, general contractor.

300 tons, high school, Windsor Locks, Conn., to Berlin Construction Co., Berlin, Conn., structurals, and Scherer Steel Co., East Hartford, Conn., reinforcing; Wadhams-May Co., Hartford, general contractor.

STRUCTURAL STEEL PENDING

10,000 tons, state viaduct, Niagara county, New York, bids closed Dec. 23.

3617 tons, state bridge work, Beaver county, Pa., project withdrawn.

2087 tons, state viaduct, Broome county, New York, bids closed Dec. 23.

2035 tons, sixth unit, The Dalles dam, Columbia river; general bids in to U. S. Engineer, Portland, Oreg.

CLASSIFIED

Help Wanted

METALLURGICAL OR CHEMICAL ENGINEERING GRADUATE wanted to assist Melting Department metallurgist in steel mill making high speed, tool, stainless, specialty steels and high temperature alloys. Reply giving details of education, experience, age, references, etc. Box 177, STEEL, Penton Building, Cleveland 13, Ohio.

METALLURGICAL GRADUATE with several years' experience for process development in steel mill making high temperature alloys, high speed, tool, stainless and specialty steels. Duties would involve development of processing procedures for new alloys as well as the improvement of processes for established alloys under direction of Process Development Metallurgist. Reply giving details of education, experience, age, references, etc. Box 178, STEEL, Penton Building, Cleveland 13, Ohio.

METALLURGIST FOR LABORATORY WORK in steel mill making high temperature alloys, high speed, tool, stainless and specialty steels. Work will include metallurgical examination of materials, writing of reports, conducting investigations of mill problems involving a large variety of alloys. Good opportunity for graduate with 1 to 3 years' experience. Reply giving education, experience, age, references, etc. Box 179, STEEL, Penton Building, Cleveland 13, Ohio.

WANTED — VERY MUCH ALIVE — ONLY Two Tool, Carbon, Alloy, Stainless Steel Salesmen to represent established steel producer. Should have good working knowledge of specialty steel production and applications. Graduate metallurgists not required, but equivalent experience a requisite. One man to cover expanding Delaware Valley Area and one to cover National Territory on special assignments. State territory preference and salary desired. Reply Box 182, STEEL, Penton Building, Cleveland 13, Ohio.

TITLE METALLURGICAL AND MANUFACTURING ENGINEERS—Challenging assignments open to recent graduates in metallurgy or mechanical engineering who are qualified to plan and develop processes tools and equipment used in telephone manufacture. All inquiries held in strict confidence. Send resume or apply to WESTERN ELECTRIC COMPANY, INCORPORATED, 2525 Shadeland Avenue, Indianapolis, Indiana.

Positions Wanted

PLANT AND PRODUCTION MANAGER, Engineering Graduate (M.I.T.) indoctrinated in practical operating experience. Proven record of accomplishment in efficient plant supervision, control, and cost reduction coupled with amicable labor relations. Reply Box 134, STEEL, Penton Building, Cleveland 13, Ohio.

EXPERIENCED FORGING ENGINEER AVAILABLE. Expert in hand tools and railroad work, production, design and management. Willing to travel. Passport in order. Reply Box 145, STEEL, Penton Building, Cleveland 13, Ohio.

MANUFACTURING ENGINEER
Twenty-five years experience in manufacturing of sheet metal stampings, tool-die design and construction. Emphasis on high speed production, progressive and deep draws. Reply Box 175, STEEL, Penton Building, Cleveland 13, Ohio.

For Sale

GRAY IRON FOUNDRY FOR SALE
Metropolitan St. Louis, Missouri—Best labor area 50,000 square feet. Capacity 60 to 100 tons daily. Will produce Castings from 10 tons to 1 lb. Railway siding, heavy crane equipment, Monorail moulding and pouring system. Gantry Crane. Flask storage, machine and pattern shop, wheelabrator, modern equipment, etc. Reply Box 156, STEEL, Penton Building, Cleveland 13, Ohio.

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Used — As Is — Reconditioned
RAILWAY CARS—
ALL TYPES
"SERVICE-TESTED"
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50-d Church Street
New York 7, New York
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PLANT SUPERINTENDENT
For small long-established Forging Plant in Akron, Ohio. Prefer man who has a good knowledge of Small Upsetters (2" sizes), Drop Hammers (3000 lbs), Maxi Presses, Punch Press, Tool and dies, etc. Plant manufactures nationally known line of Mechanic Hand Tools.
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Penton Building Cleveland 13, Ohio

IF YOU HAVE CAPACITY OPEN,
why not line up sub-contract work through an advertisement in this section? For additional information or rates, write STEEL, Penton Bldg., Cleveland 13, O.

Ores

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
N. African hematite (spot)	nom. 20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$25.00-$26.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 90c-92c per long ton unit c.i.f. U. S. ports, duty for buyer's account: 46-47%, 80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $40.00-$42.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	31.00-32.00

Domestic

(Rail nearest seller)

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines unpacked	$1.00

Antimony Ore

Per unit of 8b content, c.i.f. seaboard

50-60%	$3.35-$3.85
60-65%	4.00-4.35

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Pueblo, Colo., $94; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $114; Salina, Pa., $119; Niles, O., $125; Los Angeles, Pittsburg, Calif., $137.20.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $120; Warren, Niles, O., Hays, Pa., $125; Morrisville, Pa., $123.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $130; Cutler, Utah, $121.55; Los Angeles, $127.85.

Super Duty: Hays, Sproul, Pa., Warren, Windham, O., Athens, Tex., $137; Morrisville, Pa., Niles, O., $140; Joliet, Ill., $143.

Semisilica Brick (per 1000)

Clearfield, Pa., $130.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O. $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $77.50; Wellsville, O., $81.50; Clearfield, Pa., Portsmouth, O., $87; Peria, Ark., $109; Los Angeles $110.25; Pittsburg, Calif., $111.30.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $181; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $225; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $260; Danville, Ill., $258; Clearfield, Pa., $267.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $147; Clearfield, Pa., $148.50; St. Louis, $159.30; Athens, Tex., $155.

Nozzles (per 1000)

Reesdale, Pa., $234.70; Johnstown, Pa., $240.70; Clearfield, Pa., $241.40; St. Louis, $259.45; Athens, Tex., $247.70; Bridgeburg, Pa., $267.50.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $183.50; Clearfield, Pa., $185.50; St. Louis, $195.80; Athens, Tex., $191.80.

Dolomite (per net ton)

Domestic dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Nario, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $15.10; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite (per net ton)

Domestic, dead-burned bulk, ¼-in. grains with fines: Luning, Nev., Chewelah, Wash., $38.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.50-$14.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, O., deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32-$33; 60%, $28-$29. Imported, net tons, duty paid, metallurgical grade: European, $28-$30; Mexican, $25.50.

Electrodes

(Threaded with nipple, unboxed f.o.b. plant)

GRAPHITE

Diam.	Length	Per 100 lb
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18, 20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

900 tons, state turnpike bridge work, Lehigh county, Pa., bids Jan. 5.

550 tons, two multipurpose wing hangars, Larson Air Field, Washington state; general contract to T. C. Bateson Construction Co., Dallas, Tex., low at $845,510, by U. S. Engineer, Walla Walla, Wash.

540 tons, two multipurpose hangars, Otis Air Field Base, Falmouth, Mass.; bids Dec. 21, Corps of Engineers, Boston.

395 tons, four bridges, Warren-Brimfield-Sturbridge section, Massachusetts Turnpike Commission, Boston; bids Dec. 28.

385 tons, medium and high tensile, junior and standard beams, General Stores Depot, Navy, Philadelphia; bids Jan. 10.

REINFORCING BARS . . .

REINFORCING BARS PLACED

350 tons, Seattle University dormitories, to Bethlehem Pacific Coast Steel Corp., Seattle; John H. Sellen Construction Co., Seattle, general contractor.

250 tons, Sheraton hall and ballroom, Sheraton Park Hotel, Washington, D. C., to Fabricators' Steel, Inc., Washington; Gilbane Building Co., Washington, general contractor.

REINFORCING BARS PENDING

5100 tons, sixth unit, The Dalles dam, bids in to U. S. Engineer, Portland, Oreg.

773 tons, state bridge work, schedule 3, Beaver county, Pa., bids Jan. 7; schedule 2 calls for 275 tons, and schedule 1, 489 tons; project requires a substantial amount of structural steel.

544 tons, state bridge work, Allegheny county, Pa., bids Jan. 7.

495 tons, four bridges, Warren-Brimfield-Sturbridge section, Massachusetts Turnpike Commission, Boston; bids Dec. 28.

300 tons, Ellensburg, Wash., high school; general contract to an Oregon firm.

275 tons, also gates, valves and miscellaneous metal, Bureau of Reclamation canal project, Benton county, Washington; bids to Bureau, Kennewick, Wash., Jan. 25.

PLATES . . .

PLATES PLACED

900 tons, two navy escort vessels, to Columbia Steel Co.; Puget Sound Bridge & Dredging Co., Seattle, general contractor.

PLATES PENDING

600 tons, four 55,000-barrel ground level storage tanks, fuel terminal, Carlsbad, N. Mex.; bids late January, Corps of Engineers, Albuquerque, N. Mex.

240 tons, hull plates, Navy Purchasing Office, Washington; bids Dec. 30.

225 tons, hull plates, high tensile, General Stores Depot, Navy, Philadelphia; bids Jan. 4.

100 tons or more, sixth unit, The Dalles dam; bids in at Portland, Oreg.

PIPE . . .

CAST IRON PIPE PLACED

180 tons, 4 and 6 in., Powell Valley District, Portland, Oreg., to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

397 tons, also alternatives, 4, 6 and 8 in.; bids in at Gold Beach, Oreg., Dec. 17.

RAILS, CARS . . .

RAILROAD CARS PENDING

Delaware, Lackawanna & Western, forty 75-ft piggy-back flat cars; bids asked.

U. S. Engineer, Portland, Oreg., 3633 net tons of 130.8 and 110.4 lb rail; 3930 joint bars and 89,950 tie plates; rebids opened Dec. 14.

RAILS PLACED

Delaware, Lackawanna & Western, 3500 tons, to U. S. Steel Corp., Pittsburgh, and Bethlehem Steel Co., Bethlehem, Pa.

RAILS PENDING

U. S. Engineer, sixth unit, The Dalles dam, 193 tons track rails; basic bids in at Portland, Oreg.

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Hyde Park

RED CIRCLE Rolls ALLOY-CHILLED

Rolling Mill Equipment

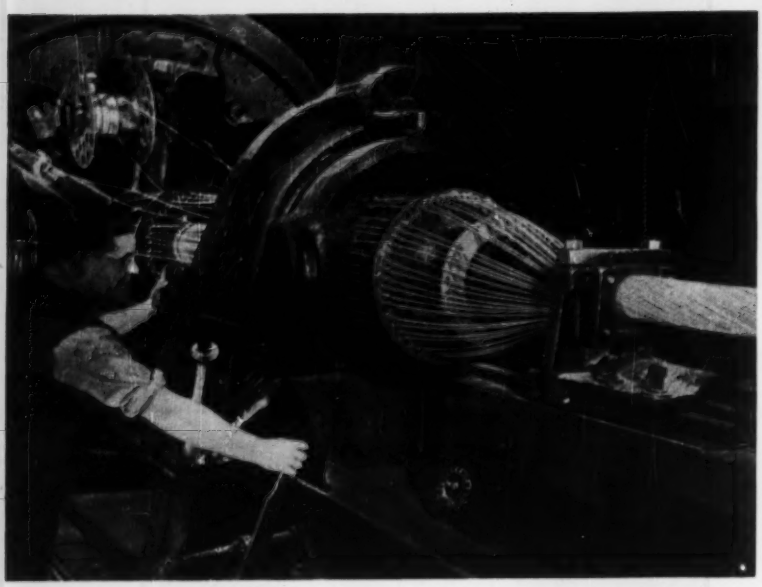
Outstanding in quality and in performance Hyde Park Rolling Mill Equipment has enjoyed the respect of the industry for more than fifty years.

Bar Mills
Merchant Mills
Sheet and Strip Mills
Pinion Stands
Roller Tables
Reduction Drives
Stretcher Levellers
Guillotine Shears
Sheet Mill Shears
Roll Lathes
Special Machinery
Machine Work

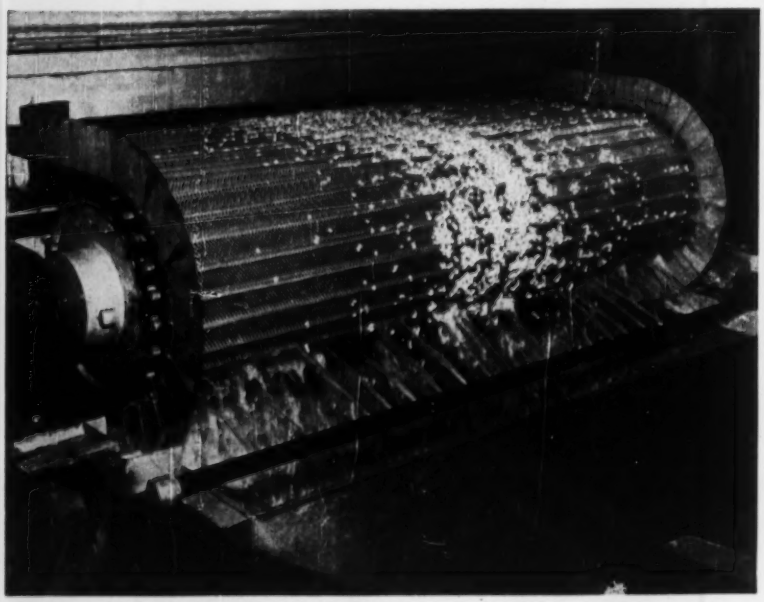
Hyde Park

FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa.
ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS

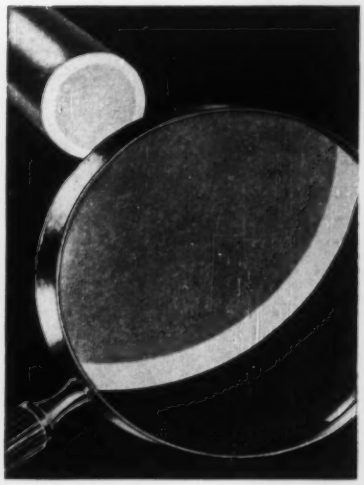
The zinc won't crack or peel when it's BETHANIZED WIRE



This submarine power cable, 4.6 in. in diameter, has an outer armor of 52 bethanized wires. Designed to transmit 27,000 hp, the 7½-mile cable is laid across the bottom of Puget Sound. It was built by The Okonite Co., Passaic, N. J., for the Bonneville Power Administration.



Bethanized wire takes a constant dousing from hot-steam and cold-water sprays as it keeps cut corn on the move in this food-freezing plant. This conveyor belt, made by The Cambridge Wire Cloth Co., Cambridge, Md., has given excellent service due to its sound construction and the long-lasting bethanized coating.



The uniform coating of pure, ductile zinc is locked on the steel. That's why bethanized wire is so resistant to corrosion, and can take such severe forming without damage to its protective armor.

Pure zinc, perfectly bonded to steel —that's bethanized wire. Bend it, twist it, wrap it—even draw it—and the highly-pure, ductile zinc armor stays put. You can depend on bethanized wire, even though the job calls for severe forming, weaving or wrapping.

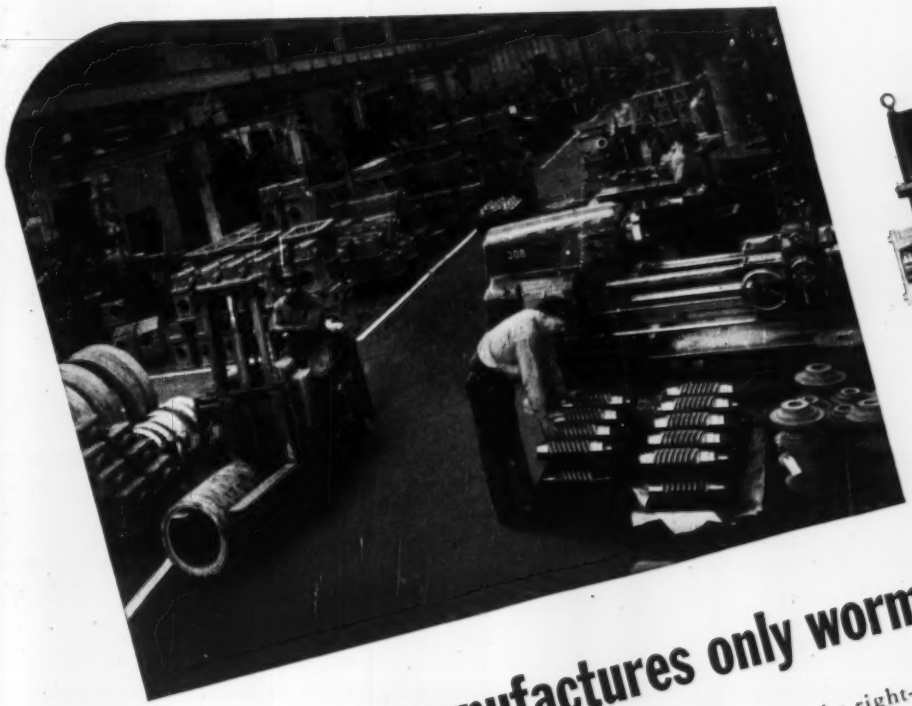
New users are surprised to discover how uniform the bethanized coating is, and how tightly it's bonded to the steel. That's the result of the bethanizing process, which electrolytically deposits the 99.99-pct-pure zinc, atom by atom, on the steel wire.

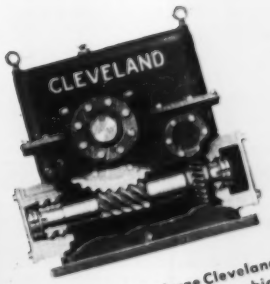
The tight, bright bethanized coating is adding sparkle and eye appeal, as well as improved serviceability, to hundreds of products made from zinc-coated wire. Like to have us arrange for a trial order in your plant? Just phone or write the nearest Bethlehem sales office for complete details.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL





●Cutaway of a large Cleveland double reduction unit which affords a high reduction ratio in limited space. Left: Assembly floor in the main Cleveland plant.

Why CLEVELAND manufactures only worm gear drives

AS EVERY machine designer knows, the right-angle construction of a worm gear drive saves space. Experience demonstrates that soundly engineered worm gearing is a highly efficient drive. And finally, perfectly matched case-hardened steel worms and nickel-bronze gears form rugged units that can outlast the machines they drive.

By devoting its entire engineering and production talent for 42 years to worm gearing alone, the Cleveland Worm and Gear Company has been able to put out the best product of its kind. As a result of this concentration, backed by top-notch performance of its products, *Cleveland leads in the manufacture of worm gearing.*

There are, of course, drive applications where worm gearing is out of place and uneconomical. Our engineers will advise you frankly. But we urge you to look into Clevelands whenever you contemplate installing a speed reducer. Free Catalog 400 will give you full engineering data and our sales representatives are ready to advise you.

The Cleveland Worm and Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

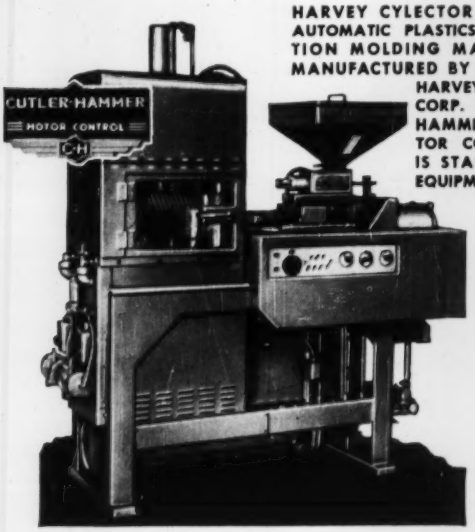
Choice of the Leaders

CUTLER-HAMMER
MOTOR CONTROL
C-H

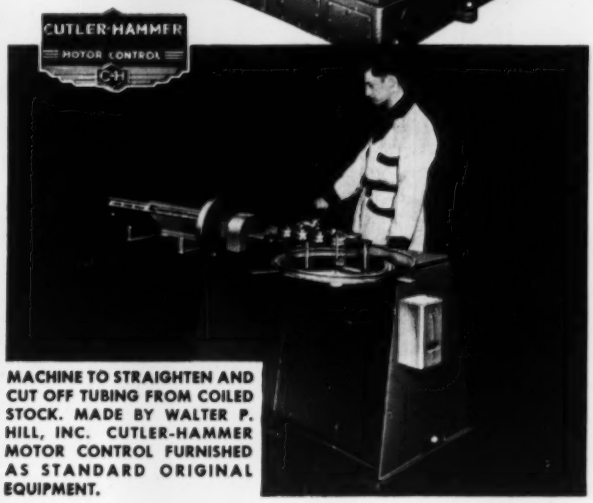
The Mark of Better Machines

DoALL BANDSAWING MACHINES WITH AUTOMATIC POWER CUT-OFF MADE BY THE DoALL COMPANY. CUTLER-HAMMER MOTOR CONTROL FURNISHED AS STANDARD ORIGINAL EQUIPMENT.

BARNESDRIL HONING MACHINE MADE BY THE BARNES DRILL CO. CUTLER-HAMMER ELECTRONIC MOTOR CONTROL FURNISHED AS STANDARD ORIGINAL EQUIPMENT.



HARVEY CYLECTOR FULLY AUTOMATIC PLASTICS INJECTION MOLDING MACHINE MANUFACTURED BY GUY P. HARVEY & SON CORP. CUTLER-HAMMER MOTOR CONTROL IS STANDARD EQUIPMENT.



MACHINE TO STRAIGHTEN AND CUT OFF TUBING FROM COILED STOCK. MADE BY WALTER P. HILL, INC. CUTLER-HAMMER MOTOR CONTROL FURNISHED AS STANDARD ORIGINAL EQUIPMENT.

It is not surprising

Improvement in manufactured articles usually comes about through companies competing for market favor, one "leapfrogging" another. But not always. There are always a few companies that don't wait for competition to bring out something better. They leapfrog themselves and as a result their hold on the market remains unbroken, their leadership unchallenged. It is notable that such consistent leaders in the field of machine design and manufacture just as consistently use Cutler-Hammer Motor Control on the machines they build. It is notable—but not surprising. For as wide awake as these companies are, it would be the supreme inconsistency for them to go to sleep on the very component that safeguards the performance they so carefully build into their machines. They provide against any risk by turning to the *known* dependability and *unchallenged* leadership of Cutler-Hammer Motor Control in its own field. And so should you. CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto, Ont.